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THE

BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW

OR

QUARTERLY JOURNAL

OF

PRACTICAL MEDICINE AND SURGERY.

VOL. XXXV.

JANUARY—APRIL, 1865.

LONDON:
JOHN CHURCHILL & SONS, NEW BURLINGTON STREET.
MDCCCLXV.

LONDON:
SAVILL AND EDWARDS, PRINTERS, CHANDOS STREET,
COVENT GARDEN.

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1. *The Third, Fourth, Fifth, and Sixth Reports of the Medical Officer of the Privy Council for the Years* 1860–63. Presented pursuant to Act of Parliament.
2. *Seventh Report of the Commissioners of Her Majesty's Inland Revenue.* 1863. Presented to both Houses of Parliament by Command of Her Majesty.
3. *The Annual Reports of the Metropolitan Medical Officers of Health.*
4. *The Annual Report of the Committee of the Manchester and Salford Sanitary Association, being a Summary of their Proceedings for the Year* 1863.—*Manchester,* 1864.
5. *On the Construction and Management of Human Habitations, considered in Relation to the Public Health.* By Dr. Druitt. Read at the Ordinary General Meeting of the Royal Institute of British Architects, Feb. 20th, 1860. pp. 11.
6. *The Address on Medicine delivered at the Annual Meeting of the British Medical Association in* 1862. By Dr. Wm. Budd. (Reprint from the 'British Medical Journal.' 1862.)
7. *On Certain Results and Defects of the Reports of the Registrar-General.* By William Lucas Sargant. (Reprint from the 'Journal of the Statistical Society of London.' 1864.)
8. *The Annual Reports of the Ladies' Sanitary Association.*
9. *The Annual Reports of the Society for the Promotion of Social Science.*
10. *The Annual Reports of the Metropolitan Association of Medical Officers of Health.*

There never was a time in our history when questions relating to the public health occupied so large a share of public attention as they do now. It is not merely that the returns of death and of the diseases which result in it, annually tabulated and commented on by the Registrar-General, have at length goaded the official conscience to repentance; but the interest in sanitary matters has extended into those quarters where philanthropic people had hitherto busied themselves with the moral and religious, somewhat to the neglect of the physical, aspect of the evils they desired to remedy. The important truth appears now at last to be recognised, that physical and moral evils mutually engender and mutually aggravate each other, and that the hope of success in eradicating either is small indeed, unless both be made simultaneously the object of attack. Questions of religious effort, questions of political economy, and social and domestic questions, all have their sanitary bearings. We rejoice that excellent people who have leisure and means at their disposal are now acting upon the theory which, after all, is the correct one—that physical and moral evils are but parts of one great circle of operation, in which all the parts act and react upon one another.

This double current of sanitary progress—that which proceeds from an official source and that which has sprung out of the convictions of thinking people, and has followed the customary channel by which such convictions find issue in action in this country, namely, voluntary association—is tolerably well represented by the books and pamphlets the titles of which we have placed at the head of this article. We purpose inquiring what this progress has been—what progress in knowledge has been made in matters relating to public health through the agency of all these labourers in the sanitary field; what material progress also—in other words, what fruit has resulted from our knowledge, and from the organizations which are occupied in putting that knowledge into practice. We propose, lastly, to consider the place which legislation has occupied, and that which it might fairly be expected to occupy, in the battle against those conditions which are known to promote the physical deterioration of our race, to lower health, and favour premature decline.

The science of public hygiene is comparatively a new one. Its traditions as part of a political system reach back indeed into very remote antiquity; but as a branch of accurate knowledge, it has only been recently cultivated, because at an earlier period those aids to its cultivation which we now possess, the art of the chemist, the microscope, an improved system of observation, with the practice of statistical enumeration, could not be applied to it. Hence it is that we shall probably find that the labours of sanitarians have been devoted most especially to the determination of primary truths, and to the enforcement of those truths upon the minds of those who possess the ability, and whose duty it is, to carry them into practical operation. Foremost among these sanitary workers are the gentlemen employed by the Medical Department of the Privy Council, whose investigations are carried on under the direction of Mr. Simon. By these gentlemen outbreaks of contagious disease are investigated whenever they come under the notice of the Privy Council; and, in addition to this, a systematic inquiry is being conducted, and is carried on from year to year, respecting the circumstances which determine the distribution of disease in England, and also respecting the vaccination of the people. These inquiries from time to time issue in attempts at legislation, the endeavour, at all events, being made to convince Parliament of the desirableness of taking some steps for the remedy of those evils, on the existence of which a low state of public health can be shown to be dependent. Next to these, but acting independently of the central authority at Whitehall, and influencing, or endeavouring to influence, for good, local governments, municipal or parochial, must be mentioned the Medical Officers of Health. The City of London, Liverpool, Gloucester, and the several districts where local self-government has been established in the metropolis, have each a medical gentleman attached to their governmental staff, who under the title of "Medical Officer of Health" is invested with certain legal powers, and who is the adviser of the town-council or vestry with which he is connected, upon all matters of public hygiene. Indirectly, the Board of Inland Revenue adds its quota to our stock of knowledge; for although the researches of Mr. Phillips and his assistants have, as their first object, the checking of frauds upon the public purse, yet the matters which they inquire into are sometimes such as concern the purity and wholesomeness of the food we eat and the liquor which we imbibe. Add to these the reports of Parliamentary Committees of Inquiry, and we shall have enumerated nearly all the available sources of official information. Among voluntary organizations working in the same field, the chief are those whose reports and proceedings we shall allude to in the course of our remarks.

Let us inquire, then, in the first place, what we have gained from all these labourers by way of addition to our stock of sanitary knowledge, or of confirming and rendering more accurate and precise the leading doctrines of sanitary science. We cannot perhaps effect this in a more satisfactory manner than by considering some of the leading questions of the day under distinct heads.

I. *The Influence upon Health of the Emanations from Decomposing Organic Matters.*—That emanations from cesspools, drains, sewers, collections of ordure, putrefying or decaying animal and vegetable substances, &c., exercise a deleterious operation upon the health of man, is a truth so far established now as to have attained almost the position of an axiom. Stated thus *generally* it requires no more proving: but judging from the fact that serious illnesses are still from time to time breaking out under circumstances which show, too clearly, that those who are responsible for preserving the public health even yet scarcely realize it; although it requires no proving, it evidently still requires a good deal of enforcing. Hence we presume it is, that the medical officers of health, in their reports to the public bodies whom it is their duty to advise, dwell year by year upon this one topic —so constantly, so repeatedly enforcing it by illustration, that we can scarcely wonder at the non-professional mind imbibing the idea that the doctrines of effluvia and stinks constitute the Alpha and Omega of sanitary science, and that good drainage is the *summum bonum* of the professional sanitarian. Unfounded as we know such a notion to be, and loudly as the writers of the reports would themselves protest against such an inference, we cannot but admit that, addressing as they do persons who are often totally ignorant of the very first principles of the science of health, they have good reason for dwelling so pertinaciously upon this theme. But writing for persons who admit the doctrine, we shall confine ourselves to the question as to how far these emanations are injurious, and in what way they operate upon the health.

One view of the subject we may at once dismiss, and it is this—that the persons who are exposed constantly to influences of this class are those who are most likely to suffer from disease in general; that they exhibit a low condition of vitality, and are laid open thereby to the operation of other causes of disease. These emanations too, like the other co-operative causes of disease, act with the greater certainty the more constant the exposure to them, and the less the exposure is alternated with change to a purer atmosphere. Neither is it our intention to touch upon the question of aguish affections as arising from undrained lands and marshes, although some remarks of Dr. Christison, in his address to the British Association, are a sore temptation to us. The only question which we propose to discuss is one on which there is still a difference of opinion among professional men. It refers, not to the influence of these emanations upon the general health, but to their operation in giving origin to specific forms of disease. On the one side we will quote the words of Dr. Druitt, the Medical Officer of Health of St. George's, Hanover Square :—" A remarkable point is how scarlatina, diphtheria, putrid sorethroat and measles herd together. If three or four persons die in a house under different medical authorities, one will return his death as measles, another his as diphtheria, another his as putrid sorethroat, and another his as scarlatina. My own conviction is, that each of these maladies, with their congeners, small-pox and hooping-cough, are so many products of putrid earth, putrid water, and putrid air festering in the dwellings around us. . . . It is constantly observed by those who have to work the sanitary machinery of the Metropolitan Local Management Act, that all these diseases flourish and fall side by side, and that the accumulating evidence of a common origin is invincible."[1] On the other side we will quote Dr. Wm. Budd :—" Not less valuable is the whole history of this disease (variola ovina) for the signal record it bears against the doctrine of spontaneous origin as applied to contagious disease. Resting on purely negative data, this doctrine is a mere figment of the mind. The offspring of a crude and early stage of scientific culture, it has come down to us as a tradition of that phase so familiar to the student of the history of science, in which things are thought to be what they first seem, and the outward semblance is taken to be the real relation. In the nineteenth century it is an anachronism. . . . If, instead of allowing our minds to be diverted by the baseless and obsolete notion that these fevers may spring up spontaneously, or by the unscientific idea that they may be generated by filth or other external conditions, we concentrate our attention on the great truth that it is in the living body only that the specific poisons on which they depend are bred and perpetuated, we shall soon learn ways greatly to abate their ravages."[1]

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[1] Paper on the Construction and Management of Human Habitations considered in relation to the Public Health.

Let us inquire a little into this matter. And first as to the *spontaneous origin* of specific diseases, such as have been mentioned, in the emanations from filth, cesspools, and sewers. It has been argued at various times and by various supporters of the doctrine :—1. That it is notorious, a thing familiar to all engaged in sanitary investigations, that diseases of this class, such as continued fevers, scarlet fever, measles, diphtheria, &c., are most prevalent in those towns and in those districts where the atmosphere is most contaminated with organic effluvia, where cesspools and open drains abound, and where the sewers are defective in arrangement. 2. That what is thus true of districts is also true of individual houses, when there exists within or about them any source of such effluvia so situated as that the effluvia shall enter the habitation — as, for instance, an untrapped drain or water-closet within the house, or a rat-hole communicating with a house-drain or sewer. 3. That it is not always the same disease which occurs under these circumstances, but that one and the same source of miasma may result in the occurrence in a house at one time of cholera, at another of scarlatina, at another of diphtheria, at another of measles or typhoïd; while, at intermediate periods of time, a low state of health may prevail among the occupants. 4. That sanitary officers and medical men have, over and over again, observed that an outbreak of some one of these maladies among the inmates of a house, has been coincident in point of time with the emptying of a foul cesspool or the breaking-in of a foul drain. 5. That although, when once produced, these diseases spread undeniably by contagion to other individuals in a house, yet it has been impossible in some instances to trace the first case to any source of contagion whatever. 6. That the experiments of Dr. Barker, who made animals breathe the atmosphere of a cesspool, and also some of those gases, such as sulphuretted hydrogen and sulphide of ammonium, which are known constituents of sewer atmosphere, show that on prolonged exposure symptoms are produced which resemble the "milder forms of continued fever common to the dirty and ill-ventilated houses of the lower classes of men." On the other hand, while the truth of all these allegations is admitted, it is argued that, after all, cesspool and sewer and drain emanations may be but the vehicles by which that which produces the specific diseases is conveyed; and that it does not necessarily follow, when these diseases originate apparently spontaneously under such circumstances, that they result from a poison the mere product of putrefaction.

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[1] The Address on Medicine delivered before the British Medical Association, 1862, by Dr. Wm. Budd.

There is some distinction to be drawn between diseases that are seen to arise in connexion with the existence of these emanations :— 1. The class of diseases most closely associated with mere putridity as a cause is that to which erysipelas, hospital gangrene, and puerperal fever belong — diseases which clearly may be generated through the contact of septic matters with surfaces on which a putrefactive action can be set up. Once established in the ward of a hospital, every one knows how these diseases spread from bed to bed by a process of contagion. The contagious principle in these instances, too, appears to be very nearly allied to an ordinary ferment in its *modus operandi*—the most nearly of any diseases reputed contagious. And it is remarkable as a peculiarity of this class of diseases, that the contagion of one will produce either of the diseases belonging to the same class. "Numerous, indeed," writes Dr. Druitt, "are the varieties of effect of hospital miasm : you may have erysipelas, you may have pyæmia—a condition in which a patient perishes with universal abscesses, or you may have low inflammation, or diffuse inflammation, all of which can be propagated artificially, and reproduce either of the others, and this more particularly if the native miasm of the hospital be aided by a blast of sewer air. Some years ago I witnessed a remarkable operation in one of the leading metropolitan hospitals. The skill and coolness of the surgeon were remarkable. But the patient died of low inflammation. I heard one of the young men attached to the hospital say, 'That patient was in Bed 19; every patient in that bed dies after an operation. It receives a blast from the water-closet. I entreated the surgeon not to put this one there; but he does not believe in sanitary measures.'" About the origin of these diseases in simple putridity we imagine there remains no doubt.

2. Now let us go a step further, and we come to a group of diseases in which the alimentary canal is principally affected. These are diarrhœa and dysentery, cholera and typhoïd fever. Do these arise, as the first class, from simple putridity? In the first place, it may be said that we have not in respect of them the same evidence from experiment that we have in respect to the first class. The experience of the Vienna hospital, now so well known to the profession in England, was to the effect that puerperal fever was produced through the conveyance to the women by students, of cadaveric putrefying products. But is typhoïd fever produced in this way? Can typhoïd fever arise spontaneously out of the application of putrid matter to an absorbing surface? A few years ago we were consulted about the origin of two fatal cases of this disease which occurred among the children of a family well to do in the world, residing in a chalk district of Surrey. The house stood alone on its own grounds, and there was no source of putrid miasma discoverable. Great pains had been taken, so far, to render the house healthy; but on asking for a glass of water, we found that it was offensive even when freshly

drawn. We immediately requested that the well might be opened, and we found that the sink for carrying off the waste water from the pump was leaky, and that matters thrown into this sink found their way into the well. The sink was situated very invitingly just outside the kitchen door, and there can be no question, amongst those who know the thoughtlessness of domestic servants, that the fluid refuse and slops were often thrown in here, in place of carrying them a few yards round the house to their proper receptacle. Again, in the autumn of 1860, an outbreak of typhoïd fever arose in a convent of Sisters of Charity, at Munich. Thirty-one of the sisters became ill one after another, some presenting gastric symptoms, and others suffering from regular typhoïd fever. Out of 14 of the latter cases, 4 proved fatal. It was found that all who became ill had drunk the water of a well, which had become contaminated from the drains into which the refuse from the laundry was habitually thrown. The water was turbid, and had a disagreeable odour. It is probable that in both these instances fæcal excreta had been one of the matters introduced into the water; and it requires no proof now that cholera, dysentery, and diarrhœa, regarding the latter as possibly a mild attack of either of the two former, may originate in a similar manner. The instances in which these diseases have apparently broken out spontaneously, under the use of putrid water, have appeared to be connected with this one source of putridity—the decomposition of fæcal matter—which has got into the water either from drains or cesspools, through town sewage flowing into the river that furnishes it, &c. And there is this difference to be noted between this group of diseases and those of the former class—that, once produced, a disease spreading by contagion produces its like. Typhoïd fever, if it spread to other persons by contagion, does not produce in them cholera, though it may produce a mild attack of something which we call diarrhœa; neither does cholera, when spreading by contagion (as it clearly sometimes does) produce typhoïd fever, still less do either of them produce the diseases of the first class. The matter of contagion, whatever it is, is specific—typhoïd producing typhoïd, cholera producing cholera. The diseases are not reproductions the one of the other. Is it then to be concluded, where the use of water thus contaminated produces either of these diseases, that it does so by virtue of the specific contagious matter which the water has come to contain? There is a good deal to be said in favour of this view in respect of cholera; and we may refer, amongst other things, to that old story of the Broad-street pump, and the outbreak of cholera in Soho in 1854. And when these diseases spread by contagion, as we call it, in a house, it is quite conceivable that a portion of the specific discharges may gain access to and contaminate the ingesta, and thus come to be applied to the absorbing membrane of the alimentary canal. On the other hand it is difficult to account, in this way, for a first case in a house, originating in putrid water derived from a source confined to that house alone, as in the instance we have adduced from our own practice. In this case either ordinary or extra-ordinary influences generated a specific poison out of excreta of a normal character, or else out of excreta of an abnormal character, such as those of a simply diarrhœal attack. In the instance of the Sisters of Charity, the first case of typhoïd might have originated in an external source.

But allowing all this, and that typhoïd, cholera, and their allied affections, may arise from the direct application of such matters in a state of decomposition to the membrane of the alimentary canal, what are we to say about the volatile emanations from sewers, house-drains, and cesspools, where fæcal matters are undergoing decomposition? One thing appears certain, namely, that all the diseases we are discussing do originate with especial frequency where there is a marked exposure to such effluvia. Is it, then, that the ordinary volatile matters which thus proceed from putrid decomposition produce these diseases, or is it that a specific poison is formed and escapes with the volatile matters of decomposition, which then merely act as its vehicle? Certainly, so far as we understand the constituents of sewer and cesspool effluvia, and, so far as we know their action, neither sulphuretted hydrogen, sulphide of ammonium, or ammonia, will produce the specific diseases referred to. It is not always where the stink from these sources is greatest that the danger appears to be greatest. Nor, so far as we understand the results of Dr. Barker's experiments, does it appear that even the compound gases from the cesspool, to which he exposed various animals, produced a disease with the specific characters of any of these diseases. The effects were those of poisoning; and the animals did not continue to be ill, but, on the other hand, recovered, when they were removed from the influence of the poison. Such is not the case with typhoïd or cholera, for these diseases continue to run their course, even when the patient is removed from the influence of the original cause. And the same thing was observed when the separate gases which make up the compound effluvia of a cesspool were employed. Certainly, these gases do produce an effect in proportion to the strength of the dose administered and the duration of exposure; and the counterpart of their effect on the lower animals is met with in men and women exposed to similar influences. The effect, however, is not a specific contagious disease like typhoïd or cholera, but a poisoning of the blood, with alteration in its physical character, accompanied with nervous prostration, vomiting, and diarrhœa; the symptoms commencing very soon after the exposure has commenced, and ceasing soon after its termination. This is poisoning, not specific disease. Besides, it is worthy of remark, that it is not every cesspool or escape of sewer gases that produces typhoïd or cholera; nor even always those which stink most offensively, as we should expect to be the case if the effluvia which occasion these diseases were those of ordinary decomposition. Every health-officer knows that it is often necessary to *search* for a local cause for these affections, and that it is only after careful searching and skilful investigation that a source of effluvia may be discovered, perhaps in some neglected rat-hole or broken trap from which bad smells have occasionally arisen, and those of so slight a nature as to have been thought scarcely worth the trouble and expense of obviating. One cannot help concluding that there is something which makes a difference, *quoad* the introduction of a specific disease, between one cesspool or sewer emanation and another, and that this consists in the presence, in or with the effluvia, of the specific poison of these diseases in one case, and their absence in another. Dr. Budd's opinion, in regard to typhoïd fever, is, that while "all the emanations from the sick are infectious, by far the most virulent part of the specific poison by which the contagion takes effect is cast off by the diseased intestines of the fever patient; that the characteristic affection of the bowels is the disease, in reality, the specific eruption of a contagious fever; that the sewers and other places into which all this virus passes are the principal channels through which the fever is propagated; that they propagate it solely in consequence of being the channels for the diffusion of the poison." Mr. Simon's commentary upon this is that, "Provisionally these conclusions must be acted upon in their present unqualified form. But doubtless it is of practical importance to learn, as exactly as possible, whether it is in all states and under all circumstances, or only in certain states and circumstances, that the bowel-discharges of typhoïd fever can effect what is here imputed to them. Typhoïd fever seems to be, in its causes as in its nature, very intimately related to other diarrhœal infections. And with reference to its being only contingently infectious, I quote," he says, "for illustration sake, from my Report of 1858, the following passage referring to epidemic cholera:—'Some interesting and important experiments made in 1854, by Professor Thiersch, of Erlangen, seemed to show that cholera evacuations, *in the course of their decomposition*, acquire a contagious property. It is much to be regretted that experiments were not simultaneously conducted by Professor Thiersch, with a view to determine whether ordinary fæces, or ordinary diarrhœal fæces, *undergoing decomposition during an epidemic period*, would not likewise have acquired that property; for the prevalence of exterior conditions, which tend to determine in certain localities a specific infectious decomposition of excrement, seems to be the essence of an epidemic period. That this decomposition may begin in the bowels, as well as in cesspools, seems possible enough; and perhaps herein lies the explanation of the many cases in which human intercourse has apparently diffused the disease. For, according to the observations of Professor Pettenkofer at Munich, and Professor Acland at Oxford, it would seem that during cholera periods, the immigration of persons suffering diarrhœa has been followed by outbreaks of cholera in places previously uninfected; and Professor Pettenkofer ascribes this fact to an infective influence exerted by the fæces of such person in the cesspools and adjoining soil of ill-conditioned places to which they go. An infection of this kind would probably extend itself to the polluted well-waters of such soils, and might render them, if swallowed, capable of exciting cholera by direct contagion." (Third Report, p. 2.)

Here, for the present, the question seems to rest. That ordinary putrefaction, under ordinary circumstances, will give rise by its emanations to maladies of the class we are considering, is a doctrine which seems likely to give way to one which maintains the necessity of a specific contagion, conveyed from a previous sufferer, either directly or indirectly by means of sewers or cesspools, and of the possibility that this infectious matter may be generated, under certain circumstances, in collections of human excrement, one of those circumstances being, perhaps, the presence, in the collection, of some fæces possessing a specific morbid character. We are happy to perceive that, on the motion of Dr. Wm. Budd, this subject has been referred to a committee of investigation, both of the British Association and of the British Medical Association. This is a good omen for the solution of the question, a question which involves also that of the dependence of contagious properties in the products of decomposition, upon the presence and nature of molecular living things in the decomposing materials; inasmuch as it may turn out that specificity in the products depends upon these, and that they are the real media by the agency of which the "morbid poison," as we term it, is conveyed into the system.

3. There is to be distinguished, in discussing the origin of specific diseases in these emanations, the class of epidemic and infectious fevers, such as small-pox, scarlet fever, measles, diphtheria, &c. We put typhus out of the question just now, because we shall presently discuss its supposed origin in overcrowding. Is this class fairly ascribable to ordinary putrefaction, or indeed to putrefaction of any kind, in earth, air, or water? In these diseases we meet with maladies which, although presenting alliances among themselves, are yet specifically distinct from each other. We possess no evidence whatever that scarlet fever ever produces measles, or measles scarlet fever, by any process of contagion; each produces its like. And so, too, with diphtheria: although it arises consecutively to either of the preceding diseases, yet, by contagion, it only produces diphtheria, or a sore throat, which last stands in somewhat the same relation to it as diphtheria does to scarlet fever, and as diarrhœa does to cholera or typhoïd fever. Taking another step, therefore, still further from that class where ordinary putridity is an obvious cause of disease, we have a sure standing-place in the established truth—than which no truth is more firmly established in the whole range of etiology—that these diseases spread from individual to individual, through the medium of some matter proceeding from the sick to the healthy—matter which may be presumed to be living, inasmuch as that which kills living matter, such as a heat of 212°, without destroying organic structure, suffices to destroy its activity. In respect of small-pox and scarlet-fever, it is quite certain that a very minute portion indeed of the specific living material suffices to convey the specific disease to a healthy person. The minutest quantity of virus from a pock will convey small-pox, if inserted under the cuticle—a momentary exposure to an atmosphere in which a patient is lying sick, even in a ward thoroughly well ventilated, or the mere act of passing an open window of his room, will suffice to impart small-pox to an unprotected person. And so, too, with scarlet fever, the contagion of which may be

conveyed to a healthy person by means of some trifling article of dress, or by the medium of the hangings or the papering of a room which the sick person has occupied. All this cannot be denied. But it is said, nevertheless, that these diseases are the products of putrid earth, putrid air, and putrid water. Is it so? Can these diseases, do they ever, arise from exposure simply to such putrid emanations, independently of specific contagion conveyed by their mediation? Apparently, they sometimes do, but is it not merely 'apparently?' If we can show that there is in any such case a possibility of the specific contagious matter having gained access to cesspools, drains, &c., we think that, resting upon our knowledge of one mode in which these diseases are most certainly conveyed, we may conclude that we are dealing with but another mode of conveyance of the morbid contagion.

Consider, then, what is the mode of life in any large town; and that which is true of a large town is equally true, within certain limits, of villages, and even of isolated dwellings in the country.[1] A cesspool is emptied, and forthwith scarlet fever breaks out among the inmates of the adjoining house. Who can trace the history of that collection of filth? Can it be asserted that some former occupants of the house had not suffered from the same disease, the only relics of which had been stored up in that hole for months or perhaps for years? A drain breaks in, or a trap of a sewer in a row of houses becomes defective, and scarlet fever, measles, or diphtheria appears forthwith among the inmates. Who can say how far the contagious material may have travelled? It may have come from only a few houses off, so far as a Londoner can tell, who does not know or care two straws about his very next door neighbour; or it may have travelled from an adjoining street, or from even a greater distance, and it might have been long awaiting the opportunity of outlet. We ourselves have traced diphtheria travelling from one house to another *apparently* in this way. In one instance the contagion appeared to have entered a house, where it carried off a whole family, by the untrapped pipes which conveyed the water from the roof into the sewer, the upper openings of these pipes being on a level with the bed-room window where the first case in the house occurred: the original case in the neighbourhood occurred in an adjoining street, the drains of which entered the same sewer as those of the house in which this series of cases was observed. But we all know that scarlet fever, small-pox, &c., may enter the best arranged, best ventilated, and most respectable houses, where there are no emanations from drains, &c., that can possibly be blamed, where the source of contagion cannot by the exercise of the greatest diligence be traced, and where, therefore, we are driven to suppose, either that the disease originated spontaneously out of nothing, or that the contagion was brought in by some concealed medium. It might have entered with the linen from a public laundry, it might have come with the meat or milk from the house of the family butcher or dairyman; it might have been contracted from some neighbour at church, or at school, or from some public vehicle which had recently conveyed a patient to a hospital, or even from a railway carriage; or finally, it might have travelled in the very air from even long distances. For aught we know, insects may be, in some instances, the media of conveyance. Two years ago, Dr. W. Budd read to the British Medical Association a most valuable lesson. Taking as his text the accurate history of a single epizoötic outbreak of disease—ovine variola—in Wiltshire, he pointed out that all the evidence in this manifestly contagious disease, went to show that it was by conveyance of the matter of contagion alone—of some portion of the specific discharge—that the disease was communicated from flock to flock; and that, until the specific disease was imported into the district, no case of the disease happened among the sheep that it pastured. In this instance, the contagion travelled from one flock to another the distance of more than a mile, possibly, in some cases, by atmospheric dispersion; in others, by the medium of the flies, which settled in vast numbers upon the diseased sheep, feeding upon the variolous discharge, by the medium of starlings, which came in quest of the larvæ of the flies, or by men who had visited the infected flocks. Everything in this history points to the transference in some way of a living material, of a portion of a specific exudation. And from this he argues analogically to human epidemics, and we think he does so fairly. The outbreak and its accompaniments were of the nature of an experiment, the conditions of which were very much under the control of the experimenter. In this class of maladies, then, it seems that a living organism, or a portion of a living organism, is, so far as we have any evidence at all, the sole medium of transmission of the disease, the sole medium by the agency of which it can originate in a healthy person, the living thing being derived from the specific matter formed in the morbid processes which characterize the disease in some previous sick person. What the 'living thing' is, we can speculate about. It is something that is excessively minute. Yet this need be no obstacle to a belief in its existence. Dr. Beale tells us of particles of living matter that may exist in multitudes in exudations from the blood, and which may grow and develop under favourable conditions, yet which are so minute as to be invisible with a magnifying power of 5000 linear; particles which may retain their vitality even when detached from the body. "Warmth, moist air, little change in the atmosphere," he says, "are conditions under which the life of such minute particles of living matter would probably be preserved, and which are the conditions favourable to the propagation and spread of many of those contagious diseases which have long been attributed to the transference of matter which acts like ferments."[1] And then to illustrate the distance to which matter of still greater tenuity may be carried through the atmosphere, Dr. W. Budd adduces the illustration of the scenting of game by the dog, sometimes the length of a very long field: "If the infinitesimally minute particles emanating at such a distance from some ten or twelve partridges, insensible as those particles are to us, can impinge on the olfactory nerve of a dog with sufficient efficacy to enable him to recognise his game, and to excite his whole frame to spasmodic action, it is easy to conceive how, under favourable conditions of weather, the emanation from a large flock of sheep stricken with variola may be wafted by a gentle breeze through thrice that space, with full power to propagate the specific disorder."

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[1] Dr. Druitt relates the following case. He says—"The difficulty of precisely fixing on the very site of an outbreak in a large town is very great; not so in a remote country seaside village at the extremity of a peninsula, which is emphatically no thoroughfare. Such a village is Swanage in Dorsetshire, where scarlet fever broke out some years since amongst the patients of my friend Mr. Willcox, who gave me the particulars. It began by simultaneously affecting 13 members of a family on whose premises a foul cesspool *unemptied for years* had burst. There was no other case for many miles around till Mr. Willcox carried the infection unconsciously to a poor woman on the other side of the hill, from whence it spread from one to another till there were 170 patients and 3 deaths. When Mr. Willcox was laid up with it the infection ceased." (p. 9.)

We say that in studying the mode of origin of the specific diseases which have been attributed to putridity, the three classes we have been considering must be kept distinct. Let us add, that, at the same time, the study of any one class may be expected to throw light upon our investigations as to the mode of origin of the others. It may, after all, turn out that the truth lies somewhere between the two extreme views we first referred to. At all events, it may be anticipated that our present notions of the mode of origin and transmission of disease are far too gross and crude, and that they will require to undergo a very considerable amount of refinement before they will correspond at all adequately with the truth of nature; for whatever the true explanation may be, it must reconcile apparent spontaneous origin with unquestionable transmission by contagion, and both with the fact that at one time these diseases spread as scourges to a population, while at another they die away into insignificance. It must further indicate the relation which they bear to epizoötics in the beast, and the remarkable similarity of the latter to, yet non-identity with, the corresponding maladies in man. Depend upon it, we are at present but upon the very threshold of the inquiry.

But we have yet to notice an *à priori* argument in favour of the spontaneous origin of epidemic diseases which, indeed, we should probably not have thought worthy of notice at all, had not Mr. Simon alluded to it in one of his reports. It is based upon the truism, that there must have been a time when the first case of each of these diseases occurred. We will content ourselves with quoting some of Mr. Simon's remarks upon this argument:

> "How their respective first contagia arose, is, as regards nearly all of them, quite unknown. This, in pathology, is just such a question as in physiology is 'the origin of species.' Indeed, regard being had to matters mentioned in the last footnote [the association of living beings with the chemical processes of fermentation and putrefaction], it is hardly to be assumed as certain that these apparently two questions may not be only two phases of one. . . . . Presuming (as may pretty confidently be assumed) that in the history of mankind there was once upon a time a first small-pox case, a first typhus case, a first syphilis case, &c., and admitting our entire ignorance as to the combination of circumstances under which those first cases respectively came into existence, we have no scientific reason for denying that new 'spontaneous generations' of such contagia may take place. But, as regards some of the diseases,

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[1] Journal of Microscopical Science, April 1864.

there are conclusive reasons against supposing that this is of frequent occurrence. Where we can observe isolated populations, we find very long periods elapse without any new rise of certain 'species' of disease. For instance, in 1846, the contagium of measles was imported by a sick sailor into one of the Faroe Islands, and led to an epidemic which attacked more than 6000 out of 7782 inhabitants; sparing only the persons who previously had had the disease, and 1500 who were kept out of the reach of contagion; but before that time, *there had not for* 65 *years been, in those islands, a single case of measles.*"

Again—

"During the 10 years 1851—60, scarlatina, small-pox, and measles were (as usual) prevailing more or less throughout the country. . . . But the 627th [Registration] district had an entire escape. In all the 10 years it had not a single death by measles, nor a single death by small-pox, nor a single death by scarlet fever. And why? Not because of its general sanitary merits, for it had an average amount of other evidence of unhealthiness. Doubtless, the reason of its escape was, that it was insular. It was the *district of the Scilly Isles,* to which it was most improbable that any febrile contagion should come from without. And its escape is an approximative proof that, at least for those 10 years, no contagium of measles, nor any contagium of scarlet fever, nor any contagium of small-pox had arisen spontaneously within its limits. I may add that there were only 7 districts of England in which no death from diphtheria occurred, and that, of those 7 districts, the district of the Scilly Isles was one. Still, to say that a disease is contagious, is not to say that it may not arise without contagion." (Sixth Report, p. 54.)

We cannot pass over, also, without comment, another observation of Dr. Druitt. He says, speaking of the origin of these diseases, "*de novo* or *ab initio,* out of filth and crowding:"

"Of course it will be seen at a glance, that belief in such a matter has some very practical bearings. For if a man believes that scarlet fever can only reach him by contagion from without, derived from some pre-existing case, he will carefully look to his front door; he will exclude suspicious visitors, and perhaps fumigate his letters, and the clothes which came from the laundress; and in doing so he will do well. But possibly he may neglect to see where the air of the house comes from by night, when his street door is closed, and every aperture by which a clean current could enter rendered as impervious as possible; and he may neither know nor care that the air of his bedroom enters through an ill-fitting door in the basement, where it has received contributions from a dust bin, from a cellar full of mouldering old hampers and straw, and from a damp coal-cellar and servants' watercloset in the area."

And this indeed would be the practical bearing of the question, if, while admitting the doctrine of transmission by contagion, it were at the same time denied that the contagion might travel to a house through the medium of sewers and drains, and be stored up for long periods in matters which were not suspected to contain it, and whose medical history had long ago been forgotten; but not otherwise. Whichever hypothesis of those we have been discussing, be adopted, we think we have shown that the practical bearings of the question remain much in the same position, and that the cleanliness of the air we breathe, the houses we live in, the food and drink we consume, and the clothing we put on, still constitutes our grand safeguard against what we term "zymotic disease." Certainly there can be no question that where any outbreak of zymotic disease occurs, the sufferers stand a far better chance of recovery in an atmosphere free from pollution, than where they are permitted to lie ill in a house defiled with dirt, and penetrated by sewer gases, or by the effluvia arising from accumulations of ordure.

II. *The Dwellings of the Labouring Classes.*—Perhaps the most difficult practical question which the medical officers of health in London have to deal with, is how to amend the conditions under which the labourer or the poor artisan lives in his home. Not that London stands alone in this matter, for the evils we are about to mention are found in every town in the kingdom. In London, however, they are brought prominently forward by those gentlemen whose duty it is to expose them, and to press upon local authorities the necessity of some amendment. Perhaps we cannot better introduce this subject than by quoting first a description which Dr. Bristowe gives of some houses at Whitehaven. It will stand pretty well for a description of some localities in the metropolis. We ourselves have seen its counterpart in the east of London very lately.

> "There are in all parts of the town courts and alleys of various sizes and shape, in which the dwellings of the poor are situated; the majority of them are narrow (from three to six feet or more wide), are approached by covered passages, have houses of two or three stories on each side, and terminate, it may be, in a high wall, or in a house, or some equally serious impediment to the circulation of air. But this statement gives no notion of the state of affairs in the more crowded parts of the town. Here you turn by a narrow passage out of one of the comparatively respectable streets, and you find yourself in a labyrinth of irregular passages from two and a half to four feet wide, communicating with another between houses, or through houses, or under houses, in the most complicated way: the houses themselves immediately bounding the passages on all sides, excepting in an occasional nook where room has been found for an ashpit and midden, or for a pigsty. It would seem that many years ago the majority of houses abutting on the streets were provided with back yards or gardens, and that as the labouring population increased these plots of ground became appropriated to dwellings for them; that without plan, without thought for the comfort or health of tenants, without any supervision, landlords crowded together on these separate plots as many houses as the plots could be made to hold, and that thus the deplorable result which I have endeavoured to describe was gradually attained." (Sixth Report, p. 785.)

Let us now state the present provision for the labouring classes in London somewhat systematically. First of all it must not be concealed that there is a class of persons (a typical one has been ably portrayed by Mr. Dickens in his 'Little Dorrit') who make this provision their especial business: who, having scraped together in trade a few pounds, invest their savings in the sort of property which the labouring classes reside in—such property being commonly held on short leases; or, rather, they purchase such as, having only a few years of the original lease to run, they can obtain at a low price. In other instances, the rents are 'farmed' to a middle-man by the leaseholder, in consideration for such payments as will enable the former to extract a profit out of the transaction. The advantages of this sort of property are, a large annual return for the primary outlay, the weekly receipt of the rents, and the absence of any demand for decorative repairs; all that the owners have to do being to collect their rents on the Monday and to keep the houses tolerably wind- and water-tight. Now in London some of the houses which fall thus into the hands of this class of persons were at one time, many years ago, in the occupation of wealthy City merchants and even of members of the aristocracy. Such houses we have seen with handsome staircases, carved mantelpieces, and embossed ceilings. Whole streets of good houses in London have degenerated in the lapse of time in this manner. Another kind of houses, purchased by such persons, are such as are built in the form of closed courts or alleys upon land once forming the gardens of houses in some adjoining street—houses crowded together in the manner described by Dr. Bristowe. Then there are other houses which they are apt to purchase, which are situated in narrow back streets concealed behind the larger metropolitan thoroughfares. Another thing must not be concealed, namely, that there is in the metropolis a class of builders who, taking land, anywhere near a large thoroughfare (in the suburbs especially), that they can get at a low ground-rent, crowd upon it as many small houses as the lax provisions of the present law will permit them to erect. These houses are raised in the cheapest possible manner, the bricks used, especially in the lower parts of the houses, where they are to be covered with cement, being commonly of a very soft, porous consistence, or else such as have been bought at a sale of old building materials, and which formerly formed part of some house that has been pulled down. No proper foundation is laid, no trouble taken to drain the land, although it may be a soft retentive clay soil; even the sods not being removed from the surface, but left to decay, as they may, beneath the flooring, which is laid almost, if not absolutely, in contact with them; no excavation or proper ventilation beneath the house being provided, and no provision whatever being made against the rise of damp by capillary attraction into the walls. The rest of the house is in a piece with the basement. Such houses are built for sale—cheap. Possibly a tolerably respectable class of persons may inhabit them for a year or two, but, finding that the roadway has not been properly made, that the drains are becoming choked and stink, that the houses are draughty, damp, and leaky in the roof, that they are out of the way and are getting somewhat dilapidated, that their landlords either will not, or cannot afford to, spend money in the repairs which they so soon need, these first tenants leave, and then the houses degenerate, as older houses have done before them. Such houses as these, too, are purchased by the "Casbys" of London. Whatever the sort of houses, large or small, however, which thus degenerate, they have this in common—that their original destination was each for the occupation of a single family; all their arrangements were adapted to this sort of occupancy. But, as soon as they thus degenerate, they are let out in rooms—mostly single rooms—to several distinct families, each having its own interests to consider, and not troubling itself about the affairs of any other. Every room is thus usually let to weekly tenants, even to the kitchens, sometimes to the very cellars, and thus, as the numbers of a family increase, each house and each room becomes more and more crowded. Indeed, the larger the family a poor man has, the greater is the difficulty he experiences in finding a lodging; and, as most of the persons who have the more comfortable rooms to let object to large families, such families are driven into the worst and lowest localities, and often into the smallest rooms. Hence it seems to be, that the medical officers of health habitually find that the most objectionable houses, on the score of sanitary arrangements, are the most crowded with inmates, that their inmates are the poorest of the population, the dirtiest, the most negligent, the least moral.

Let us enter one of these houses, and see what is the state of affairs; and we are here drawing a picture only too familiar to our own eyes and, we may safely add, to those of every metropolitan health officer. In the first place everything about the habitation itself marks the carelessness of the owner and the wretched negligence of the occupants. The common staircase is pretty sure to be more or less out of repair, and encrusted with the perennial dirt which it has never been anybody's particular business to scrub away; in houses built back to back, dark, unventilated, and narrow—in the older houses, probably dark from the blocking up of windows years ago to save the window duty, the lights not having been replaced, to save money. Each room close and stuffy, partly because the windows will not open, or, being opened, will not remain so, because the sash-lines have long since disappeared;—dark, because the windows are too small, or because the room is so shaped (especially in some courts) that the light from the single window will not penetrate into all parts of it, or because the broken panes have been patched with paper or stuffed up with old rags;—offensive in its atmosphere, partly on account of a whole family of father, mother, and children, with perhaps a lodger or friend taken in to help to pay the rent, live and eat and drink in it by day, and sleep in it by night, partly because there is no ventilation through it to carry off the animal emanations from the inmates themselves, and partly because the clothing of the family cannot be conveniently washed, and because the bedding, which has over and over again been saturated with the discharges of the woman in her labours and the urine of children, never is and never can be purified;—the walls and ceilings smoked, dirty, and dusty, and stained with slain vermin, the paper hanging in shreds or separating from the walls in consequence of the damp. The ceiling of the top rooms may show indications of a leaky roof or broken rain-water pipe; and in the bottom rooms of the house the floor-boards are seen to be rotten, wet earth being perceptible through the holes that have broken in or have been gnawed by the rats, and the walls stained perhaps all the way up with the damp which has risen from the foundation. And now let us step into the back yard, if there be one—or perhaps there is but a common court-yard to a number of little houses—and what do we see? Probably that the whole surface is uneven, and either unpaved or provided with a pavement of old bricks not cemented together, or of broken stones or oyster-shells. In the summer weather, we see this surface dry, dusty, and strewed with vegetable and animal refuse which there is no proper bin to receive, and which, with the dust from the fireplaces, &c., has been thrown into some corner and from thence scattered by the children or by the wind. With all this, myriads of flies, which are Nature's scavengers, are doing their best to convert putrifying dead matter into living matter that does not putrify. In wet weather, the yard is wet, sloppy, or muddy, there is no drainage for the surface, or if there be a gutter, perhaps it is inclined the wrong way, and the gully-hole is choked with filth or untrapped. The privy, usually situated somewhere conveniently near the back door or in a corner of the common court, is either a cesspool or situated over an open drain; or else, if panned and communicating with a drain, the latter is either imperfectly trapped, or the trap is broken, or the pipe is choked up from improper things being forced into it or in consequence of an absence of water to cleanse it. Of water supply there may be none, or only what is to be derived from a stand-pipe in the court, which runs some twenty minutes in each twenty-four hours, and not at all on Sundays; or from a tank sunk in the earth and covered with boards which permit the surface water and filth to drain into it, and which is soon emptied by the inhabitants, who scramble to get some for use during the day, preserving it in pitchers or in a tub, each in their family room. Or if the house has a supply of its own, the butt is rotten, leaky, without a tap or ball-cock, both of which we may be told are stolen as soon as put on, and find their way with the lead pipes to the marine-store dealer; or if there is a cistern it is uncovered; butt or cistern, in any case, having at the bottom a museum of curiosities mixed with filth of all kinds, and exhibiting a variety of forms of vegetable and animal life which flourish upon their sides and within them. Lastly, look at the inhabitants of the house themselves: unclean—how can it be otherwise? When several persons of all ages and both sexes sleep and live constantly together in one room, how can the necessary ablutions be performed?—unclean, most so the women. How can it be otherwise when water is too scarce even for the cleansing of the house, the washing of the clothing (for which there is no accommodation), and the preparation of the food—always the first thing to be provided for? Half fed, or if abundantly fed, irregularly, and with food which is rarely properly cooked. We need carry this description no further. Of course it is not asserted that all these unsanitary conditions coexist in every labouring man's habitation, but there are those in which they do. Here is Dr. Ballard's description of one of several courts situated opposite the Angel at Islington, and occupied by low Irish.

"It (Water's court) is entered by a tolerably wide covered passage from the High-street. The houses are on three sides of an irregular quadrangle. . . . None of the houses have any ventilation through them. The rooms are very small; they vary in capacity from about 830 to 1600 cubic feet; but however small, we almost constantly find each room occupied by a family. The rooms in Nos. 6 and 7 and in No. 15 appear the smallest of any, and during the past year we have found, in single rooms of these houses, families numbering from four to six persons, exclusive of friends now and then accommodated for the night. Thus occupied we have found as little as 147 cubic feet of air allotted to each inhabitant of a room measuring 18 feet long by 7 feet wide and 7 feet high. None of the houses are particularly well-lighted, but in Nos. 12 and 15 some rooms are so dark that a person entering must often remain some minutes before he can clearly distinguish their contents. At the further end of the south side of the court is the *common* privy, than which I can conceive of nothing much more disgusting. It consists of an iron tank intended to hold water, but never containing any; and seats of the ordinary character are dispensed with as a luxury the low Irish of this court did not appreciate. Even the tank appears superfluous, inasmuch as a preference is shown for the floor and doorway, while slops intended for the tank are often thrown in so carelessly at the entrance of the privy as to be spattered over the walls. . . . *Above the privies* is placed the *water-tank* for the supply of the court, in which I have been credibly informed the boys of the court have been seen bathing in the summer time; so that besides absorbing the foul gases from beneath, the water acquires occasionally another equally indescribable pollution. The drain from the privies runs beneath No. 6, and the surface of the court is never clean for many hours after being swept up by the contractor." ('Seventh Annual Report of the Medical Officer of Health for Islington,' p. 10.)

The other courts adjoining are described also, in language very similar. Still, we say, all labouring men's homes are not so bad; but all, or nearly all, show one or more of the defects we have enumerated, principally imperfect ventilation with overcrowding, want of light, damp, and dirtiness, and withal personal uncleanliness, and either under-feeding or improper feeding, especially on the part of the women and children.

And what is the effect of all this?—for it is impossible, except in some isolated instances, to separate the influence of one of these unsanitary influences from the influence of the remainder. We will again refer to some of Dr. Ballard's Reports. He has taken the trouble to map out the parish of Islington into some 35 small districts, and the influence of all their conditions appears in the death-rate, especially the death-rate of the children, when comparing districts occupied by the more wealthy with those occupied entirely or mainly by the labouring classes. In some streets which he enumerates the death-rate in 1861 (the census year) amounted to as much as from 106 in the thousand children living under 5 years of age, to 187 in the thousand under 5 years; and grouping the districts together which agreed in the character of their population, he found that, in the same year, while on an average only one child under five years of age died in each 36 families in the most respectable districts, one in every 19 of the families in the poorest districts lost an infant in the course of the year. The extremes were one in 94 families in the most respectable districts, and one in 12 families in the poorest districts. In the Report for 1863 he contrasts the death-rate in the district of the Irish courts, before mentioned, with that of a district of quite an opposite character which adjoins it. The latter contains a population of 800, while that of the Irish courts is only about 200 more; yet in the one there were in 1863 but five deaths, and none of these under 5 years of age, while in the other the deaths were *nine times* as numerous, and more than half of them were deaths of young children. A somewhat similar contrast is drawn by Drs. Aldis and Druitt in their annual summary of sanitary statistics for the year ending March, 1863. They divide the Hanover and Mayfair sub-districts into two classes of streets, viz. :—1. The aristocratic and first-class business streets; and, 2. The second and third-class business streets, the mews and streets occupied by the artizan and servant classes. In the former the deaths were at the rate of 10 per 1000, and one-fifth were of children under 5 years of age. In the latter, the deaths of persons who died at home were at the rate of 19·8 per 1000, and of these nearly one-half were children under 5 years of age. Of course it may be objected to such a comparison, that there were probably more children to die among the families of those who occupied the second group of streets than among those who occupied the first group of streets; but we imagine the difference could not well be equal to the difference observed between the two series of deaths. In Dr. Ballard's instance again, it cannot be argued that, in the respectable district adjoining his 'Irish courts,' there were living no children at all under 5 years in a population of 800 souls. And to return to these courts: he gives an account of the deaths in these during a period of four years, which exhibits pointedly the operation of some of the causes of ill-health that we have enumerated as existing commonly in the habitations of the labouring poor. Thus, as respects Water's-court, some particulars of which we have quoted, he writes:

> "The population of the court is 130. This is not so high as it used to be, on account of our frequent interference to abate over-crowding; in 1856 it was 150. Out of the entire population we found 32 to be infants under 5 years of age. The deaths during the four years amounted to 31, or nearly a quarter of the population. Nineteen of those which died were infants under 5 years of age. And now I must call your attention to the distribution of these deaths. The only houses which have had no death in them for four years are Nos. 1, 2, and 3. These houses receive the only pure air that enters the court from the passage into the High-street, the prevalent winds sweeping their face, and then whirling round the court, carry the effluvia from the privies to the houses Nos. 6, 7, 8, 9, &c. Corresponding with *this course of the current of air and the situation of the privies*, we find the distribution of the mortality, and especially of that from zymotic causes, and in the most marked degree from certain particular forms of zymotic disease. There were single deaths (not of infants) in Nos. 4, 13, and 14, which we may pass over for the moment, to concentrate attention upon No. 5, on the south side, and upon Nos. 6 to 11 on the north side. In all these houses there were one or more deaths from zymotic disease of some kind, but in no others, with the exception of No. 12, to be separately considered. In No. 5 there were four deaths, two of them of infants, one dying from measles and the other from hooping-cough. This is the house against the side of which the filthy privy is placed. No. 6 (the smallest-roomed and most crowded house in the court) is situated directly facing the privy, at a distance of a few paces from it. In this house three deaths occurred, all from some form of zymotic disease—viz., one from child-bed fever, one from diphtheria, and one from diarrhœa. At No. 7, next door to it, three deaths also occurred—one from a pulmonary affection, one from consumption, and one from cholera. The only two deaths, then, in the court, referred to bowel complaints occurred in the two houses most exposed to the

privy effluvia. At No. 8 two zymotic deaths occurred (one of an infant), viz., one from diphtheria and the other from measles. At No. 9 two infants died, one from scarlet fever. At No. 10 three persons died, two being infants, and one of the deaths was from smallpox. At No. 11 two deaths occurred, one from consumption, and one, of an infant, from scarlet fever. And now, for Nos. 12 and 15, *the two darkest houses in the court*—and darkness implies, be it recollected, invariably two other things, very bad ventilation and an abundance of dirt. In No. 15, small and over-crowded, there occurred five deaths, four of these of infants; but here the special conditions produced not zymotic but tuberculous disease. Two of the deaths were referred to consumption, the highest manifestation of this class of maladies, and another was from some other form of tubercular affection. A fourth death was referred to disease of the chest of an acute kind. In No. 12, four deaths occurred, three of them tuberculous (one being consumption); the fourth death was from smallpox of a highly malignant petechial or putrid type." (*loc. cit.* p. 10.)

A similar story is told of others of these Irish courts. In one, with a population of 124, of whom 19 were under 5 years of age, 19 persons, of whom 13 were under 5 years of age—i.e., between 15 and 16 per cent.—died in the course of the four years. In another court (Smith's-buildings), with a population of 140, of whom 31 were under 5 years of age, 20 per cent. died in the course of the year, or, taking the children alone, 58 per cent. of those under 5 years of age. Among these houses, there were eight which were occupied by a much dirtier and lower class of people than the rest of them; and there were ten of them occupied by a somewhat tidier class of Irish, and all these ten houses were exceptionably well-ventilated. In the eight former the deaths at all ages in the four years amounted to 28 per cent. of the population, and 11 deaths, or full 100 per cent. among the children under 5 years of age. In the ten latter houses, on the other hand, there were but four deaths, only two of them being infants. And similar contrasts are shown in respect of other courts, and particular houses in the courts; all of which tend to show that where a free ventilation through any houses of this class is provided, it goes far towards counteracting the evil consequences of foul emanations and some other unsanitary conditions.

But to this sort of argument, showing that unhealthy places are especially fatal to infants, Mr. Sargant objects. He says: "Unhealthy places are not more fatal to infants than to adults." He says a distinction must be drawn, in estimating the cause of a large mortality among young children, between those under one year of age, and those over one year and from this to 5 years of age; inasmuch as the former necessarily stay at home with the mother, and it is natural that they should be thus protected, while the latter require for their health and development a free exposure to an out-of-door atmosphere, and plenty of exercise in play. If impurity of the air were the cause of so high a child death-rate in London, we should expect to meet with it principally among infants under one year, whereas the opposite is the case. Taking the male death-rate alone, he shows that "whereas the London death-rate of infants under one is the same as that of all England, the London death-rate of children over one and under 5 is higher than that of all England by 30 per cent.; it is as 137 to 105. "Why," he asks, "should London infants be healthy and London children past infancy be very unhealthy? Is it the impurity of the air? Surely that would injure infants more than others. It cannot be the want of domestic care, or of medical attendance; for if so, why should infants escape? I conjecture it is the want of space, and the consequent confinement of the children to the house or room in which they live; a circumstance not so injurious to infants, comparing them with infants of the same class in society elsewhere, because, as they cannot run about, they are everywhere confined to the same room as their mothers. . . . . It is no wonder that London children, cooped up in part of a house, set maternal care and medical attention at defiance, and die by thousands." (p. 198.)

Now, although we are ready to allow that London children who are old enough to run about, especially those in poor districts, do suffer very much from the cause pointed out by Mr. Sargant, we confess we think that he attributes to it too much, while he attributes too little to another very obvious cause of a high mortality among them. As to young infants, we must say that, so far as our experience goes, (although we are not now prepared to show it by figures,) the more unsanitary conditions prevail in any small locality, the higher is not only the death-rate among such children, but the higher also is that among younger infants. Especially high, in the slums of London and other large towns, are the deaths returned to the registrars as the result of "teething," "convulsions," "hydrocephalus," "premature birth," "atrophy and debility," or "inanition." We have no hesitation in asserting that, were the localities of these infant deaths under one year closely investigated in London, they would be found in a very large majority of instances to have occurred in the families of persons who resided where unsanitary conditions most prevailed. And as to the older children, we think that Mr. Sargant has omitted to take into account the fact that nearly all the mortality between the ages of one and 5 years is caused by those epidemic and contagious diseases to which children are especially liable, and the spread of which in large towns and cities is favoured by the close manner in which the inhabitants are packed together. Taking Mr. Sargant's own table of the male death-rate in the several districts of London for four years, and the vital statistics of them as given in Table C. (p. 220–1), we think we can show that it is this close packing, and not the mere space which there happens to be unoccupied by houses, and which children can use as play-places, on which the high death-rate indirectly depends. The amount of crowding is represented in his table by the "number of persons in a house," and the amount of space for exercise, &c., by the "number of acres to each 100 persons." We do not think this mode of estimating the amount of crowding quite unexceptionable, but pass the objection over for the present. The death-rate (male) between one and 5 years of age he gives for all England (during four years) as 105, for London as 137. Now, of the 16 districts he tabulates there are two only in which the acreage per 100 is at all considerable, viz., Lewisham, 26·01, and Hampstead, 11·79, and it happens that in both these districts the crowding is comparatively small also—less than that of London (7·80 in a house), being stated at 6·77 and 7·20 for the respective districts. The death-rate in these is also low, the lowest of all the districts, viz., 104 and 116. In respect of these districts no doubt both influences operate in favour of healthiness. But what of the remaining 14 districts? Setting aside the two districts we have mentioned out (as disturbing the average unfairly), we may state that the mean acreage of those parts of London which the 44 districts make up only amounts to ·73 per 100 persons. Of the 14 districts, there is one just about the mean, viz., Bethnal Green, ·72 per 100; five above the mean, and eight below it. Bethnal Green has a death-rate of 139, only just two above that of London generally. The five above the mean present together an average acreage per 100 persons of 1·12; the eight below the mean an average acreage per 100 persons of ·48. We shall expect, then, to find that the death-rate of children in the latter eight districts will, on an average, exceed considerably that of the former five: and so there is a difference, but it is only to the extent of 25, the means being, for the five more open districts 143, and for the eight less open, 168. Let us now compare the same 14 districts in the matter of crowding in a house. Five of them have an amount of crowding less than that of London generally; and in nine of them the number of persons to a house is greater than in London generally. The mean number of persons in the former five is 7·33; the mean number in the latter nine is 9·94. As respects the deaths in these two sets of districts, we find that in the five less-crowded the average death-rate of the children amounts to 146, and in that of the nine more crowded it amounts to 164. The difference is 18, which, at all events, shows that the instances selected by Mr. Sargant do not altogether support his views of the entire independence of the death-rate from the influence of crowding. And if we select for examination from his tables the five districts in which he represents the crowding in a house to be greatest (that is, over 10 persons in a house)—that is to say, the districts of St. James, Westminster, with 10·60 persons in a house; St. Martin's in the Fields, with 10·13 persons in a house; Strand, with 11·39 persons in a house; St. Giles, with 11·53 persons in a house; and West London, with 10·52 persons in a house—we shall find that the child death-rate over 5 years constitutes an average of 177—a death-rate which is higher than the death-rate of London by 40, and higher also than the highest death-rate of any one of the remainder of the 16 districts which he refers to in his table. It is also worthy of notice that one of these five districts, with so high a child death-rate, namely, St. Martin's in the Fields, is the very district in which (with the exception of Lewisham and Hampstead), the amount of play-room for children, according to Mr. Sargant's mode of estimating it, is largest. We say again, we object to his method of estimating both the amount of play-room and the crowding (for as respects the latter especially the size of the house is a consideration of importance); but taking his table as it stands, we say that it does not support his opinion, but rather the contrary one—namely, dependence of a high child death-rate principally upon those circumstances which conduce, by the bringing together of many in one house, to the spread among them of contagious diseases, and, by the crowding and its concomitants, to the imparting to such diseases a higher tendency to fatality. And let us add here,—to return for the moment to the death-rate of infants under one year,—that Mr. Sargant's table supports just as little his view, that this is independent of unsanitary conditions: for, if we take the nine districts which he represents as the most crowded, we find the mean infant death-rate to be, in every instance but one (St. George's, Hanover-square), higher than the infant death-rate of London (161), the mean being 173; that of the five districts in which the largest number of all occupied one house being 175; whereas, in the remaining seven districts, where there are fewer in a house than in London at large, the death-rate amounts to 153.

There is one member of the class of epidemic diseases whose spontaneous origin in unsanitary conditions we have deferred the consideration of—*typhus;* and we have done so because it is to the influence of human emanations by over-crowding that the origin of this disease has been attributed—a doctrine which we find constantly repeated by the majority of the Medical Officers of Health. We think that too much is made of this doctrine; we think that it should be differently stated—that lower ground should be taken respecting the cause of typhus, and that it should be enough at present to hold that over-crowding promotes the spread of typhus, leaving the origin of the fever an open question. Much that we have said about the other epidemic and contagious diseases applies to this; and so we shall simply state some further reasons which induce us to withhold, for the present, our subscription to the origin of typhus in over-crowding, or even in over-crowding, dirt, and destitution conjoined. One of these reasons is, that if this doctrine were true in an unqualified form, typhus fever should always exist as an endemic disease in London and other large towns where these conditions are never absent in some locality or another, and in which, we are disposed to believe, the total amount of over-crowding and dirt varies little year by year. Yet it is not so. Typhus is absent or almost absent from London for years together; for years together the Fever Hospital may be visited in vain in search of typical typhus cases, except when an occasional case drops in. And then, towards the beginning of some winter the cases begin to drop in faster, and soon all the available beds are too few for the sick admitted—the disease has assumed the proportions of an epidemic. Crowded houses in poor neighbourhoods furnish very many of the admissions, although not all. In a valuable analysis of three hundred cases of typhus admitted into the Town's Hospital at Glasgow, by Dr. J. B. Russell, we find him stating that "Poverty was not a characteristic of these patients. . . . In not above ten persons were there evident signs of starvation, or even of deficient nutrition. . . . . While privation was not a characteristic, over-crowding and want of personal cleanliness were. The average numbers given as sleeping in one apartment were five to ten, sometimes reaching as high as fifteen. . . . . Living in such a state of aggregation, it was not surprising to find the state of the person in general most disgusting, especially of the female patients. In fact, the skin is to such people virtually lost as an organ."

As to the exciting cause of the attack, Dr. Russell tell us:

> "The large majority traced their illness to some form of contagion—to the prevalence of fever in the same land or close; to its previous appearance in their own family; to their having slept in lodgings or at home with persons newly dismissed from fever wards; to washing the bedclothes or apparel of fever patients. The danger of sleeping with patients recently dismissed from hospital seems to have been recognised by the poor."[1]

We have said that we very much doubt whether over-crowding, dirt, and poverty, are anything but assisting causes to the spread of the contagion of typhus; assisting causes which operate most manifestly when, from some external conditions which we do not understand, typhus becomes epidemic. During the present epidemic season we have taken some pains to inquire into this connexion, and the result has been, that wherever we have done so, in a considerable number of cases of typhus, we have not failed in any case to establish exposure to the contagion of the disease. Sometimes this has been very trifling, apparently, and sometimes very brief in duration, but still it has happened. An instance which lately came under our notice may be adduced as illustrative of our view. At the commencement of the last year, it became our duty to inquire into an outbreak of typhus in a house, one of a row of houses situated in an open locality. There was bad drainage, and there were a variety of other nuisances about all the houses in the row, and all the houses were occupied by the same class of poor wretched tenants; but the only house in which the fever appeared was No. 3. It was a double eight-roomed house, the four lower rooms tolerably ventilated, the four upper ones very badly ventilated indeed. The size of the seven occupied rooms varied from 1152 to 968 cubic feet, and the number of occupants of the seven rooms was 41. One of the back-rooms upstairs (a smaller room) was occupied day and night by a family of 10 persons, mostly grown up, giving them a space of 96 cubic feet ($= 4{\cdot}6 \times 4{\cdot}6 \times 4{\cdot}6$ feet) to each individual. The remaining rooms were somewhat less crowded. At the adjoining house to this, No. 2, there was a similar over-crowding, and remarkably enough, the room corresponding to the back room just mentioned, in No. 3, was similarly occupied by a family of 10 persons. All were equally poor and dirty; yet with all this similarity as to over-crowding, filth, and poverty, while fever raged in No. 3, and attacked all the inmates except three (and this exception is a doubtful one), not a solitary case of fever happened at No. 2. The difference simply arose from the admission of a woman ill with typhus into No. 3, while no such event happened in No. 2. The fever in No. 3 did not commence in the very over-crowded upper room. It spread from a sick lodger on the ground-floor, first of all, to an adjoining room, containing six persons, on the same floor, and did not travel into the upper back room, where 10 persons were cribbed up together, for a period of two months, and then all 10 fell ill. Some years ago, Dr. Alison maintained like views to our own, in the pages of this Review,[1] and quoted in illustration of them, his experience of fever as it has appeared in the old town of Edinburgh, asserting "that there is no close in Edinburgh, however filthy and ill-drained, which may not remain for many years together quite free from fever, if there be no importation of single cases of fever into it." The history of two fever houses in Burt's Close, which he narrates, runs parallel with, and teaches the same lesson as the outbreak of fever which we have just briefly detailed.

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[1] Glasgow Medical Journal, July, 1864, p. 144.

III. The distress among the Lancashire operatives, and the high price which meat has attained of late, together with the notorious sale in the large dead-meat markets, and in shops, of meat that has been obtained from diseased animals, together with the equally well-known prevalence, of late years, of certain epizoötic maladies among flocks and herds in this country, has given occasion for inquiries on the part of the Government, which were placed in the hands of Dr. Edward Smith and Mr. Gamgee. To the report of the latter of these gentlemen, which relate to the diseases of our domestic cattle, and the effect which the flesh, when consumed, exercises upon man, we shall now advert. This report constitutes part of the appendix to the Sixth Report of the Medical Officer of the Privy Council. With regard to Dr. Smith's report, we may simply say that it is a most elaborate inquiry into "the exact dietary of the low-fed population in this country," with a view to ascertain "upon how small an amount of food persons might live," and "to demonstrate upon what food large masses of the population do live." The sanitary bearings of this inquiry are of no mean importance, for not only is a low-fed population more open than a well-fed one to the inroads of disease, but it means much more than this. Mr. Simon justly says:

> "It must be remembered that privation of food is very reluctantly borne, and that, as a rule, great poorness of diet will only come when other privations have preceded it. Long before insufficiency of diet is a matter of hygienic concern, long before the physiologist would think of counting the grains of nitrogen and carbon which intervene between life and starvation, the household will have been utterly destitute of material comfort:—clothing and fuel will have been even scantier than food—against inclemencies of weather there will have been no adequate protection—dwelling space will have been stinted to the degree in which over-crowding produces or increases disease—of household utensils and furniture there will have been scarcely any—even cleanliness will have been found costly or difficult, and if there still be self-respectful endeavours to maintain it, every such endeavour will represent additional pangs of hunger. The home, too, will be where shelter can be cheapest bought—in quarters where commonly there is least fruit of sanitary supervision, least drainage,—least scavengering,—least suppression of public nuisances,—least, or worst, water supply,—and, if in town, least light and air. Such are the sani-

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[1] Vol. xiii. p. 313.

tary dangers to which poverty is almost certainly exposed, when it is poverty enough to imply scantiness of food." (Sixth Report, p. 14.)

Some of the results of Dr. Smith's inquiries were the following:— 1. That for the examined agricultural population, the diet was not so poor as for the examined in-door operatives. 2. That while in both classes, of course, poverty was found to tell least upon those who were without families, yet in both classes, but very especially among the agriculturists, insufficiency of food does not nearly so much affect the married labourer as it affects his wife and children. 3. With respect to the in-door operatives, Dr. Smith shows that, taking the estimated mean of 28,600 grs. of carbon, and 1350 grs. of nitrogen, in the food supplied, as the theoretical and approximative need of an average adult (an estimate which can only form an approximative and imperfect standard for comparison), among the classes examined—viz., silk-weavers, needlewomen, and kid-glovers, shoemakers, and stocking-weavers—"in only one (the shoemakers) did the average just exceed, while in another (stocking-weavers) it nearly reached the estimated standard of bare sufficiency, and that in two classes there was defect—in one (needlewomen) a very large defect—of both nitrogen and carbon. Moreover, as regards the examined families of the agricultural population, it appeared that more than a fifth were with less than the estimated sufficiency of carbonaceous food; that more than one-third were with less than the estimated sufficiency of nitrogenous food, and that in three counties (Berkshire, Oxfordshire, and Somersetshire) insufficiency of nitrogenous food was the average local diet." (p. 13.)

The inquiry relating to the prevalence of disease amongst domestic cattle, and its influence upon the health of our population, could not have been intrusted to better hands than those of Mr. Gamgee. Nearly every number of the periodical which he so ably edits—the 'Edinburgh Veterinary Review'—contains something relating to the subject. So much so is this the case, that we ourselves habitually consult it for information on all those questions where veterinary science enlightens the path of the medical inquirer. The Report of Mr. Gamgee is appended to the fifth Report of Mr. Simon.

1. The first topic he discusses is, *The present amount of cattle disease in the United Kingdom.* In 1854, he estimates that the total number of horned cattle in the United Kingdom was 7,646,998, which he values at about 10*l.* per head. Prior to 1842, the average mortality could not be estimated higher than 1¼ to 2½ per cent. In 1844, in consequence of the appearance of disease in this country, the first cattle insurance company "The Farmers' and Graziers'," was established, but in four or five years its losses were so enormous that it became bankrupt. Still other companies were started, but, after increasing their rates of insurance, these also had to be wound up, thousands of cattle dying, and three-fourths of the claims on the companies being the results of incurable disease. In 1857, it appears, from a return made to Parliament by Mr. Hall Maxwell, that the average loss on stock in Scotland was

about 5 per cent.—viz., on dairy cows, 5·604; other cattle, 4·172; and calves, 5·604; the estimated value of cattle annually lost in Scotland being 510,085*l.* The annual loss in Ireland, in 1861, was 1,132,687*l.*, and the loss in England, in 1860, Mr. Gamgee estimates at 3,805,939*l.* The chief loss was from an imported disease, pleuro-pneumonia, and the loss was greatest amongst the best and highest priced cattle—more than half. The loss in 6 years, ending 1860, in the three kingdoms, he estimates at 2,255,100 head, the value of which at 11*l.* 10*s.* per head, is 25,934,650*l.* Of these cattle, considerably above one million died from pleuro-pneumonia, and represented a value of twelve millions sterling. The value of the cattle thus lost was 5·89 *times the value of the cattle imported.* Amongst sheep, of which 40,000,000 are reckoned to be kept in the United Kingdom, the average loss by disease is not less than 4 per cent., representing a money loss of 1,600,000*l.* The loss from disease among pigs, he calculates at about 3 per cent., representing a money loss of 1,209,000*l.* Among cows in large towns, the loss from disease is very much larger. He has known it amount to 50 per cent. On the 12,000 cows kept in London, there is an annual loss, he believes, of at least 80,000*l.* The high price to which all kinds of butcher's meat has attained is fully accounted for by these statistics. It is to be recollected, however, that the diseased animals are commonly not buried, but either the entire carcase, or such parts of it as are presentable, are sold for food; and that if it were not so, meat would be very much higher in price, and quite beyond the reach of the poorer part of our population.

2. *The Nature of the Prevailing Cattle Diseases* is Mr. Gamgee's next topic. He first considers the *epizoötic* diseases, all of which are contagious. These maladies travel in Europe from east to west, and exist more generally and constantly on continents than on islands. The *pleuro-pneumonia* in cattle is the first of these. It often occurs in a latent form, and in its earliest stages can only be detected by auscultation. It has an incubation stage of five or six weeks. It attacks an animal as a rule only once in a lifetime, and cannot much be helped by medical treatment. *Aphthæ, the foot and mouth disease,* affecting the feet, mouth, and teats, has been chiefly observed in Britain in cattle, sheep, and pigs, and was never more prevalent than in 1862. It is characterized by a mild fever of an epizoötic and decidedly contagious character. The incubation is very short, and hence it is said usually to precede pleuro-pneumonia in cattle. When both diseases are taken in market at the same time, the aphthous disease breaks out before the lung disease.—*Variola Ovina, smallpox in sheep.* This is a specific malignant fever, which spreads exclusively by contagion, affecting an animal only once in its life. and is characterized by a vesicular eruption, especially on those portions of the skin scantily covered with hair. As a rule, it is not communicable to other animals. The period of incubation is about a fortnight, and the disease passes through similar stages to human small-pox. The attack lasts about twenty days or a month: 50 to 90 per cent. of those attacked die, usually on the fourth or fifth day of the eruption.—The *Steppe disease, a contagious typhoïd fever of cattle,* is characterized

by specific lesions of the intestines, similar to those observed in the enteric fever of man; but there is no tendency to ulceration and perforation. It is very contagious. The period of incubation is usually a week.

The *Enzoötic diseases* Mr. Gamgee believes to be preventible to such an extent, that, if the subject were attended to, their prevention would add more to the resources of the kingdom than the reclamation of land does. "They are due to excessive richness and excessive poverty of land. They are also due to excessive moisture, or, on high and dry lands, to exposure. They vary with different systems of culture: they are engendered by forcing land to produce the largest and best crops, or by impoverishing the soil in attempting to rear more than it will bear. Enzoötic disorders are induced by the manner in which animals of different species are brought together and made to live in common." The following are the more important of them:—*Anthrax*, or *carbuncular fever*. This has many forms, all originating spontaneously, and communicable by contact or inoculation to warm-blooded animals; and, though rarely spreading by contagion in this country, yet apt to assume an epizoötic character in countries which are hotter. It is a disease in which the physical characters, and physiological properties of the blood are altered, and in which passive hæmorrhages, ecchymoses, phlegmons, boils and carbuncles, and gangrenous complications occur with fatal effect. It originates most readily in young and vigorous animals, and in those that are suddenly changed from spare to liberal keep, and on rich lands that are usually damp and ill-drained. What is termed "splenic apoplexy" is a form of this disease, and is rapidly (in 4–24 hours) fatal, especially if the animal be left quiet.—The *braxy* in sheep is another virulent form of it, although the term "braxy" is applied to many other fatal diseases. Braxy kills 50 per cent. of the sheep that die annually in Scotland, and the victims are usually found dead by the shepherds on cold frosty mornings, and after clear moonlight nights. The body rapidly undergoes decomposition.—*Black quarter* in sheep and cattle is a form of anthrax occurring chiefly on undrained soils, and is, next to pleuro-pneumonia, the most fatal of all cattle disorders in this country. Together with symptoms of fever there occurs a painful swelling either at a fetlock or other joint, with emphysema of the limbs, and the skin sloughs over the swelling. "It is important to notice that in very rapid cases, or when animals are slaughtered in the early stage of the disease, it is only one of the fore or hind quarters which indicates the disease of which the animal has died. The other three quarters may and have often been sold as sound meat."—*Anthrax in the pig—Apoplexy*—or the *Hog cholera*. In respect to one form of anthrax, known as carbuncular angina, in which the fauces are the seat of inflammation and sloughing, and which proves fatal with typhous symptoms in from one to three days, Mr. Gamgee confirms Hering's statement that it occurs in pigs fed upon the flesh of animals dead of anthrax. The pig-"apoplexy" occurs in animals which have been fed on richer food than they are accustomed to. The "hog cholera," or "blue disease," is regarded by some as typhus, and kills in from three to six hours.

There is usually abdominal pain, with vomiting and diarrhœa, or marked weakness of the hind-quarters, and a subdued cough. The characteristic discoloration of the skin and mucous membranes commences some time before death, and occurs especially on the belly, on the inner surface of the hind extremities, on the back, ears, &c. After death the skin looks black and blue, as if the animal had been knocked about. Ham-bacon dealers pass off such blotches as bruises. The capillaries and veins are gorged with blood, and the serous and mucous membranes are studded with ecchymoses. A specimen of such pork was recently exhibited by Dr. Letheby, at a meeting of the Metropolitan Association of Health Officers, when he stated that this disease is common in London piggeries. We have, however, carefully looked at the pork on sale in shops, and have seen no signs of it having been thus diseased; probably it finds its way into the sausages.[1]—The *Parturition fever in cows* occurs in plethoric animals, and is characterized by cerebral congestion and apoplexy; death results from general paralysis.—The *Heaving pain in ewes* is also a parturition fever, but here congestion and mortification of the womb occur, and the animal dies in a few hours.—*Blood disease in lambs* is another result of plethora, and usually kills in 24 hours. Mr. Gamgee does not consider it a contagious disease. Swellings of an anthracoïd character frequently appear about the throat, lips, ears, limbs, &c.—Lastly, there is the *Red-water in sheep*, which he regards as a blood-disease, and which is characterized by an effusion of reddish serum into the abdomen.—The *Parasitic diseases* cannot be known too perfectly, inasmuch as human beings derive most of their parasites from the domestic animals; but, as such a full consideration as their importance demands from us, would occupy too much space in the present article, we shall defer what we have to say upon this subject until we review the admirable work of Dr. Cobbold which has just appeared.

3. *The Etiology of the Cattle Diseases* is the next subject taken up by Mr. Gamgee. And first as to *pleuro-pneumonia*, he maintains that it always occurs by way of contagion—that there are truly "stations" where the disease is always to be met with, and from which it is carried by cattle which have passed through them. Such "stations" are all our large towns and foul cattle-markets, and many cattle-dealers' farms. We confess that the proofs of this position advanced by Mr. Gamgee, and the fact that the indiscriminate free-trade in cattle established in 1842 was coincident with the great outbreak of the disease in this country, are, to our mind, absolutely convincing. These proofs, to which we can only just allude, are derived first from the general history of the disease, and its geographical distribution at the present moment; secondly, from the history of separate invasions of countries, estates, parishes, and farms; thirdly, from facts relating to the constant prevalence of the disease in large towns; fourthly, from the results of experimental researches in Germany and France; and, fifthly, from the result of his own experience as to the means which check the pro-

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[1] Since the above was written, a large seizure of pork, thus diseased, has been reported in the papers, as having been made at a wholesale pork-pie manufactory in Islington.

gress of the disorder. He states that "our large towns, with their thousands of fine dairy cattle, stand first on the list as to the prevalence of pleuro-pneumonia; next are the grazing and stall-feeding districts and counties; and the healthiest portions of England, Scotland, and Ireland are those where animals are bred. All this demonstrates that in proportion as purchases have to be made, disease is rife. It is absent where there are no buyers and where all are sellers" (p. 249.). *Epizoötic Aphthæ* "appeared almost simultaneously in London and Cork in 1839, owing to importations of cattle, and then spread as usual with greater rapidity and certainty than all other plagues. . . . The contagious principle is discharged by diseased animals in very large quantity with the saliva and from the eruptions on the teats and feet. The milk of animals affected is highly charged with it as a rule, but probably only when vesicles exist on the teats, and their contents are discharged as the milk is drawn. . . . . By far the most common and constant means operating in favour of an extension of the disease consist in placing cattle, sheep, or pigs in railway trucks in which diseased animals have previously been, and exposing healthy with diseased in the public market. . . . It is invariably introduced here, and spreads exclusively by contagion" (p. 258.)—*Small-pox in Sheep.* A section of Mr. Gamgee's report, and nearly the whole of Dr. W. Budd's 'Address in Medicine,' are devoted to the etiology of this disease, and to proving its exclusive origin in, and propagation by, contagion. Especially instructive in this respect is the history of its origin and spread in Wiltshire at the commencement of 1862 in the flock of Mr. Joseph Parry, of Allington, in a down district traversed by driftways in all directions, and skirted by a canal, near which the disease first broke out. It is believed that through this part of the down, about a fortnight before the outbreak, was driven westward a flock of infected sheep, which were sold at Smithfield, and it is reported that some of them died of small-pox lower down the Avon. By the canal, also, it is probable that, as is customary, the dead animals' skins, from which manure is made, were conveyed. From this flock it spread to eight other flocks in the neighbourhood, one of them at least three-fourths of a mile distant, another about a mile and a half from Mr. Parry's farm. Another farm in which it broke out was Mr. Church's, situated fifteen miles from the site of the Allington outbreak. In this instance the sheep had been pastured in a field bounded by a high-road over which sheep from the infected district had passed to and fro. The disease was finally suppressed by studious separation of the infected animals.

Among the causes of *Enzoötic disease*, Mr. Gamgee enumerates the practice of farmers keeping a limited amount of stock on more food than is required for it, and on rich food, as oil-cake, with the object of making manure—the use of water containing much saline matter, climate, clayey and undrained soils, season, and the liberal use of artificial manures to the land—inducing plethora in the cattle—or of nitrate of soda, inducing diarrhœa, or of the manure from large towns, which often contains such poisons as lead.—As to *Parasites*, they are invariably generated from pre-existing parents; and the causes which predispose to parasitic diseases are all those which tend to weaken, such as filth, foul air, bad food, impure water, and overcrowding and over-stocking.

4. The most important portion of Mr. Gamgee's Report is, to us, that which relates to *the trade in cattle, meat, and milk.* And first as to *cows:*

> "A dairyman is always buying. The cows he buys start from the breeder's hands healthy. They are being transferred from place to place in contaminated trucks, or perhaps in the same trucks with diseased cattle; they pass through our meat markets, are there constantly placed in contact with diseased cattle, and lastly enter cow-houses—sometimes very ill-conditioned cow-houses—where disease exists, and whence, in every probability, they must themselves issue diseased. In the case of our town dairies, the system at present carried out condemns, I believe, at least half the animals to be slaughtered diseased. Are all these cows sold as human food? With few exceptions they are; and if they were not, town-dairymen would be ruined. The principal exceptions are those of the lean animals, which (as I shall afterwards show) are bought up for use in piggeries, and only indirectly contribute to the supply of human food. It is important here to notice that a fat diseased cow (sold at 18*l.* or 20*l.*) is not usually eaten as inferior meat." (p. 275.)

As regards *lean store cattle* the same causes of contamination are at work. Infected cattle are seen in all our weekly markets, and being eagerly bought up, contaminate store stock to an extraordinary extent. With respect to the *foreign cattle trade*, Mr. Gamgee tells us that it is a universal practice abroad to sell out into England the remnants of diseased herds and flocks; and that very large profits are made sometimes by dealers, who, hearing that disease has broken out on a farm, offer a lump sum for the whole infected stock, and send it to Hamburgh, Harlingen, or Rotterdam for the British trade. The *dead-meat markets* are contaminated by the carcases of diseased animals from all sources. The proof of this is not wanting to any one who will read the reports of seizures made in them by the City meat-inspectors, and recorded regularly in the reports of the Medical Officer of Health. Dr. Letheby writes to Mr. Gamgee that in the City markets alone his inspectors seize from one to two tons of diseased meat every week; and similar seizures, but to a less extent, are made in butchers' shops and slaughter-houses outside the City by the Medical Officers of Health and their assistants. In Edinburgh, Mr. Gamgee tells us that 100 and 200 diseased cattle are sold in the dead-meat market every week, carcases being smuggled in by night even from adjoining piggeries. In this way the best butchers, in ignorance, "may and do serve diseased meat to the wealthiest in the land." Mr. Gamgee, while stigmatizing private *slaughter-houses* as most objectionable, asserts that the establishment of public abattoirs has entirely failed. In this we quite agree; for though the arrangements of the private slaughter-houses in London, under the vigilant eye of the Medical Officers of Health, have been vastly improved, we ourselves know of some where diseased animals are habitually slaughtered, little else being received. One, we ourselves induced the magistrates in Quarter Sessions to close, by refusal of the annual licence, on this very ground. In that instance the butcher was believed to carry on a regular and constant trade with a neighbouring sausage-maker. Mr. Gamgee says he has known even the diseased organs themselves sent to the sausage-maker. From our own experience of the trade, we can quite believe the truth of this assertion. *Pigs* are largely fed upon diseased meat which is too far gone even for the sausage-maker, and this is saying a great deal; and as an universal rule, diseased pigs are pickled and cured for bacon, ham, &c. In Cork, Waterford, Belfast, &c., there is a regular trade in diseased pigs, a reduction of price, amounting to 10*s.* per pig being made on the pig proving measly; and the bacon made from it is sold at about 3*s.* per flitch reduction. Such measly hams and bacon are regular articles of trade; and though little used in Ireland (where the disease is known) are imported largely into England and Scotland. As to "Hog cholera," sometimes as many as 8 per cent. of pigs purchased will show extravasation. Such "tainted" or "bruised" flitches find a readier sale in Ireland, and it is said that some retailers in England order "measly" flitches specially, and that all that Waterford can supply go to London. We know now, therefore, if we did not before, how it is that in some retail shops bacon can be sold at 4*d.* per lb. and ham at 6*d.*—*The Milk trade.* The most extensive dairies are those in which pleuropneumonia is most constant; yet, according to Mr. Gamgee, dairy-keeping is now one of the best trades going. One of the Edinburgh dairymen told him that "nobody knew how to make money out of cows until the disease came amongst them." The secret is, that the cow-keeper calculates on his cows, which he purchases newly-calved, becoming diseased after being a time in his sheds; but during the first two months the yield of milk is twice as great as at any other time; and when the two months are up they will, even if diseased, fetch from the butcher such a price as, with the amount obtained for the milk, will put a profit of about 16 per cent. on his purchase. "Any man," says Mr. Gamgee, "can accumulate capital at such a trade."

5. *The effects on the human subject of consuming the flesh and milk of diseased animals* constitutes the last topic in Mr. Gamgee's report, and we must confess that this section adds but little to our knowledge of the subject. Putting aside the parasitic diseases, it is still very doubtful how far disease in the beast produces disease in the individuals that consume its flesh. It may be that the prolonged use of diseased meat brings about chronic disorder in man, but of this we have no proof. All the records which we possess of ill effects supposed to be due to the use of diseased meat have reference to acute derangements. And almost without exception these records are defective in some one or more points, which it is important should have been stated; and especially in the neglect of stating the period after death of the beast, at which its flesh was consumed, the real nature of the disease, and the amount of cooking which the meat had undergone. When we come to bring all the published records of cases of sickness supposed to be due to this cause, together, one cannot fail to be struck with their remarkably unsatisfactory character. So loose, indeed, are most of them, that no definite result can be fairly

arrived at by their aid. The present position of the question of the influence of diseased meat seems to be this:—1. That after eating some particular piece of meat, those in a family who have partaken of it have suffered, while those who did not, escaped. 2. That in some such cases it has been ascertained that the animal which furnished it was in some way diseased, while in other cases no evidence of this has been obtainable. 3. In some such cases, only one family which ate of the flesh has suffered, while other families who have been supplied from the same animal did not. 4. That in some such cases the meat has been obviously bad, either possessing a bad smell, not necessarily, however, a tainted smell; or being discoloured. 5. In some such cases, it has appeared that the cooking has been insufficient to coagulate the meat throughout, but in others no account of this appears on the face of the records, or at least none but is open to question. 6. That mostly, whatever the disease in the animal, the effects produced have been referable to the digestive system, the symptoms being vomiting, diarrhœa, abdominal pain, prostration and collapse, and often the attack has been mistaken for one of cholera, or suspected to be due to mineral poisoning. 7. That now and then the attack has really resulted from mineral poison, as in a case quoted by Mr. Gamgee, where 107 persons suffered from partaking of the flesh of an ox, to which two ounces of tartarized antimony had been given. 8. That almost any meat, if "muddled," will produce similar symptoms to those we have sketched. 9. That sausages, which are notoriously manufactured from meat which is not presentable in the mass at a butcher's shop, have very often been the occasion of such symptoms. And yet, if all the diseased meat that is consumed in London, let us say, were of necessity unwholesome, would not some wide-spread pestilence bear witness to the fact?

> "Is it possible," asks Mr. Simon, "that cattle having all the foulness of fever in their blood, or having local sores and infiltrations that yield one of the deadliest of inoculable morbid poisons, or having their flesh thronged with larval parasites,—is it possible that such cattle can be converted into human food, and yet not only the immediate scandal of a general poisoning be escaped, but even something not unlike general impunity be the result? Though the affirmative answer to this question may at first sight seem strange, nevertheless, it is, with some qualifications, the true one. And doubtless the impunity, such as it is,—but it perhaps is far less general than it appears—results from the operation of well-known chemical and physiological laws. Our animal food, before we take it, has for the most part been exposed to so high a temperature that any parasites which had their homes in it are killed, and that whatever albuminous morbid contagium it contained has been coagulated and made inert. Probably, also, against small quantities of animal poisons—and against such as communicate small-pox and glanders, just as against the venom of the cobra and rattlesnake, the stomach has resources of its own—for any such organic product entering the stomach is at once (as regards that mobile chemical constitution on which its efficiency depends) exposed to the strong disinfectant chemistry of digestion, and thus, within narrow limits of quantity, is likely to be rendered inert before it can soak into living texture. Both these influences may count for something, and the first-mentioned of them for almost everything, in ex-

plaining the fact (so far as it is a fact) that many sorts of diseased meat are eaten with impunity. On the other hand, it must be remembered that in this theoretical explanation the two protective influences do not cover the whole field of danger; for, in the first place, not all meat which is eaten has been exposed throughout (not in every instance even at all exposed) to a temperature sufficient to kill parasites, and coagulate albumen: in the second place, even complete coagulation of albumen may, for aught which we know to the contrary, leave some morbid poisons in operation: in the third place, it may very well be, that even where cooking can divest a meat of some original specific infectiveness, the meat may still not be susceptible of quite the same digestional changes as healthy meat when eaten undergoes. And thus the theoretical apprehension would be, that with our alleged large consumption of variously-diseased meat, the impunity of consumers, though it was the rule, might be subject to considerable exceptions. Accurate empirical knowledge in this matter is hitherto only beginning to be gathered, and will not yet warrant any general dogmatic statements as to the effects of diseased meat on human consumers." (Fifth Report, p. 24.)

So far, then, it appears that the subject, as thus summed up by Mr. Simon, stands much where it did when our article on it was put forward some years ago. Our want is "accurate empirical knowledge," in the first place; and it is to the credit of the Metropolitan Association of Medical Officers of Health, that they have recognised the want, and are seeking to supply it. They have asked that cases of supposed poisoning by meat should be forwarded to them, and have furnished a scheme, which Dr. Ballard has extended, in accordance with which these observations should be recorded. We may hope that this request for co-operation will not be fruitless.

There is one subject which is only incidentally touched upon by Mr. Gamgee, we mean the relation that exists between epizoötic maladies in our domestic animals and epidemic diseases in man. It is a little cultivated branch of research, notwithstanding that it is one which etiologically promises much fruit.

IV. We must now leave this subject to consider another, relating to food, which a few years ago, in consequence of a series of articles in the *Lancet*, was attracting much more public attention than is given to it at the present time. We allude to the *adulteration of food.*

If we look into the last edition of what is now regarded pretty much as the text-book upon the subject in this country, Dr. Hassall's 'Adulterations Detected,' we shall find a list of some forty articles of food which undergo, at the hands of dealers, more or less admixture with foreign substances. The object of these admixtures, which take place both with eatables and beverages, is not of course to poison the public, but either to produce an article that shall please the eye, or else to enhance the profits of the dealer, by the substitution in part of some cheaper matter. In some instances, as with chocolate and some cocoas, the articles sold are really manufactured articles which make no pretensions to consisting of only a single ingredient; the admixture of sugar, arrowroot, &c., being not in any way injurious, while it is necessary for the purpose of providing the public with the sort of drink that they desire to prepare. Now, putting aside painted confectionary, and putting also aside those adulterations, as of mustard with flour, pepper with dirt and sago-meal, ground spices with all kinds of ground rubbish, there are really very few articles the adulteration of which, as carried on in this country, is such as there is any ground whatever for believing to be deleterious to persons who consume the adulterated article. When we name bread, pickles, and beer, we name, we believe, the only three articles of daily use which are purposely adulterated with what is believed injurious to health. Other things, as cider, or wine, may, like water, become accidentally poisonous from dissolving poisonous metals; but these are not such adulterations as we are now contemplating. Custard-powders have been found to contain chromate of lead, cayenne and curry-powder red oxide of lead and cinnabar; but these are not articles of daily use, and the few persons who use them largely are usually careful either to prepare their custards from milk and eggs, and to purchase their cayenne at good shops, and pay a good and fair price for it, and to prepare their curry-powder at home. We shall, therefore, confine our observations to the three articles of food we have mentioned, and inquire what evidence there is of their extensive adulteration at the present time, and how far that adulteration is likely to injure health. We may say, however, here, as we may not have an opportunity of saying it further on, that we believe that there existed a few years ago a very unnecessary amount of panic upon this subject. Everyone was crying out about "death in the pot." It is true that scandalous frauds upon the pockets and stomachs of consumers were then, and are still perpetrated—exhausted tea-leaves were dressed up with valonia, re-dried, and sold as congou; coffee was made up with roasted chicory, beans, and dried liver; and epicurean palates were tickled with sprats when they anticipated being regaled with anchovies. All this was, and is, very wrong, and undoubtedly, like short weights and unjust balances, should be put down by the strong arm of the law; but at the same time it is one thing to steal and another thing to commit murder.

Bread and flour, but bread especially, have been said to be largely adulterated with alum. According to Dr. Hassall, every sample of bread purchased in London which he examined,—that is, in two series of inquiries, one conducted upon 28 samples, and another series subsequently upon 25,—was found to contain alum. Other experimenters have not been so fortunate. Perhaps bakers have improved under the exposure of their evil deeds; perhaps the method of Dr. Hassall might not have been faultless. At all events we ourselves have failed in detecting it in every loaf we have examined, and we know that several of the Metropolitan Officers of Health, who are experienced analysts, are satisfied that although the adulteration is general in the trade, it is yet not universal. And the same is the case in Manchester, as appears from the report upon adulterations made by Dr. Angus Smith, assisted by Drs. Calverts and Schunk, Professor Roscoe, and Mr. O'Neill. Out of five samples examined by these gentlemen three contained alum, and two contained none; and these samples were purchased from shops supplying the labouring classes in different parts of the town. The detection of the salt depends upon the separation of alumina from the bread. This is no easy matter; and there is some reason to believe that some early experimenters weighed as alumina the phospate of alumina, and so formed an exaggerated estimate of the quantity introduced by the baker, while others actually introduced alumina in the reagents which they employed. The usual process consists in charring, or, better, in incinerating the bread in a platinum crucible and boiling with dilute hydrochloric acid. When the solution thus obtained is precipitated with ammonia it yields a mixed phosphate of lime and alumina. This is boiled with liquor potassæ or liquor sodæ, which takes up the latter and leaves the former salt. If nothing more be done but neutralization and re-precipitation with ammonia, the phosphate of alumina, and not the earth itself, would be obtained. It is therefore necessary to separate the phosphoric acid. This may be effected by neutralizing with hydrochloric acid and precipitating the phosphoric acid by means of caustic baryta, subsequently removing the excess of baryta by the cautious addition of sulphuric acid. From the filtered solution alumina may now be thrown by ammonia. This is of course only a sketch of the process—its great defect is that the caustic alkalies always contain themselves more or less alumina, and, as this is not readily separated from them, it is necessary first to estimate the quantity present in the alkali and to make the necessary deduction for it from the final result; and this is a precaution which we fear has not always been taken. Other processes have been suggested by which the use of caustic alkali altogether might be dispensed with, and we think that the merit of the best of these processes lies with Mr. Crookes. His process is a tedious one, but we ourselves always adopt it, since it has this inestimable advantage, that it never discovers alumina if none be present. 500 grains of the bread are charred and the coal thus obtained is powdered; to this add about 30 drops of oil of vitriol and heat until vapours begin to rise; when sufficiently cool add water, and boil for ten minutes; filter, and evaporate the filtrate until fumes of sulphuric acid begin to be evolved, when 10 grains of metallic tin and an excess of nitric acid must be added, together with water drop by drop, until action between the acid and metal commences. When all the tin is oxidized, add water and filter. Evaporate the filtrate until fumes of sulphuric acid are again visible, when more water must be added and the liquid again filtered if necessary. To the clear solution now add tartaric acid, then ammonia in excess, and sulphide of ammonium. Evaporate the liquid, containing the precipitate suspended in it, in a dish, until all the smell of sulphide of ammonium has disappeared. Filter, evaporate to dryness, and ignite to get rid of the organic matter. Powder the black ash, boil it in moderately strong hydrochloric acid, filter, add a crystal of chlorate of potash and boil for a minute; now add chloride of ammonium and ammonia and boil for five minutes. Any precipitate now observed will be alumina.[1]

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[1] Chemical News, April 1861, p. 207.

A confirmatory test lies in the detection of ammonia in the bread, inasmuch as the alum used is invariably an ammonia-alum. Potash-alum is rarely manufactured now-a-days. This is a very simple matter: an ounce of bread is heated in a flask with water and a little lime, a glass tube bent horizontally is fixed in the mouth of the flask, and a bit of reddened litmus-paper slipped into it. The volatile alkali given off will then restore the colour of the paper. But is alumed bread prejudicial to health? There must be no *à priori* reasoning in the answer to this question. It will not do to say that alum is an astringent, and therefore its daily use in bread must produce the same results as if given in any other way, since once put into the dough and baked it remains alum no longer: the alumina in the bread is converted into an insoluble phosphate. The only test of unwholesomeness lies in experience, and experience certainly does not give a verdict against it. If it is unwholesome the unwholesomeness has yet to be proved, and the burden of proof lies with those who assert it.

The detection of copper or lead in shop *pickles* is so easy a matter that no doubt, we imagine, can rest upon the statements of any analyst who is at all fitted for the work he undertakes. We believe, however, that the presence of these metals is almost entirely accidental, that is, that they are derived mostly from the vessels in which the pickles are prepared, and not from any intentional addition of a copper salt: not that this makes the case much better for the public, who ought to be protected from the results of such carelessness, especially when the maker obtains the advantage of an article the appearance of which is in his favour. We believe that pickles are still rarely obtainable in which copper or lead cannot be found. Hassall never failed to find copper in the London pickles, and the recent investigations at Manchester discovered copper in three and lead in one out of five samples examined. Mr. Wentworth Scott goes so far also as to say that 91 per cent. of London pickles are more or less adulterated, and that in Liverpool the adulteration is often greater still.

The most dangerous adulteration which *beer* undergoes is that with cocculus indicus. The protection against this and such other adulterations, as with grains of paradise and tobacco, is chiefly the vigilance of the officers of the Inland Revenue. Respecting the prevalence of these adulterations, Mr. Phillips, the principal of the Laboratory at Somerset House, thus writes:

> "Generally the prohibited materials employed in the adulteration of beer are not injurious to health, and it is but seldom that instances come under my notice in which poisonous substances have been used, the object of the fraudulent brewers or retailers of beer being more to increase the bulk of their goods than to render the beer stupefying by the addition of noxious materials. Still there can be little doubt that the practice of adulterating beer with poisonous matters, such as tobacco and cocculus indicus, is more prevalent than might be inferred from the small number of detections made, as the fraud is difficult to discover unless the offender be caught in the act of committing it. Considering, therefore, this circumstance, and the abominable character of the offence, I am of opinion that it would be only just to the community to make public

the names of those persons convicted of adding cocculus indicus and other deleterious substances to beer brewed for sale; and I feel no hesitation in stating that the two instances of the use of the dangerous drug in question occurred in the neighbourhood of Wirksworth, in Derbyshire, and that many of the detections of the use of grains of paradise were also made in the same district; and I may further say that the experience of many years has led me to the conclusion that the adulteration of beer with drugs, as distinguished from the mere dilution or increasing of the bulk of the article, is more prevalent in the midland counties and the West Riding of Yorkshire than in any other parts of the kingdom." (Eighth Report, p. 19.)

But there yet remain to be considered two articles of food which are articles of large daily consumption, and are largely adulterated, although with articles not deleterious, the adulteration being of a nature, in the one case, to reduce the amount of nutritious matter, and the other to substitute a material which, with many persons, is apt to disagree with the stomach; we allude to milk and butter. A great deal of nonsense has been current about the adulteration of milk, which has been said to be thickened with sheep's brains and whitened with chalk. The truth is that there is only one adulteration practised, and that is dilution with water, either alone or after the removal of some of the cream; and with the aid of the lactometer this sort of tampering is very readily discovered. According to Dr. Voelcker, it appears:

"1. That good new milk has a specific gravity of about 1030. 2. That skim milk is a little more dense, being about 1034. 3. That milk which has a specific gravity of 1025 or less, is mixed with water or naturally very poor. 4. That when milk is deprived of about 10 per cent. of cream, and the original volume is made up by 10 per cent. of water, the specific gravity of such skimmed and watered milk is about the same as that of good new milk. This circumstance, however, does not constitute any serious objection to the hydrometer, as milk skimmed to that extent cannot be mixed with water without becoming so blue and transparent that no instrument would be required to detect the adulteration. 5. That when unskimmed milk is mixed with only 20 per cent. of water, the admixture is indicated at once by the specific gravity of about 1025."[1]

The principal adulterations of butter have been supposed to consist only of water and salt in excess; but we are satisfied that a rumour of another kind of adulteration—namely, with dripping and other kinds of animal fat, such as are prepared on a large scale both for home use and for exportation in the close proximity of London, and at establishments which we could point out—is not without a solid foundation. The varieties of butter which are thus sophisticated are, we believe, almost, if not quite, exclusively those sold under the designation of "fresh butter," and "fresh Ostend butter." This adulteration is practised to the largest extent in those samples which are sold at a cheap rate. Dr. Ballard has ascertained[2] various modes of detecting this. The simplest, which any one may practise, depends upon the mode in which butter and beef or mutton fat respectively solidify after melting in hot water. If an ounce of pure butter be put into a half-pint beaker and filled up with boiling water, stirring round with a rod, the layer of melted butter which collects at the top, when viewed at the side appears as if very finely cellular, and when cold and removed as a cake to drain upon blotting-paper, may be broken down by gentle pressure into a fine mealy powder. If, on the other hand, butter adulterated with foreign fat be similarly treated, the melted layer is seen to consist of an agglomeration of more or less large-sized drops, giving to it a coarsely cellular appearance; and when the cold cake is drained on blotting-paper and broken down gently, it breaks into little globular independent grains, about the size of pearl-sago, the size varying with the amount of foreign fat present. Another test consists in exposing a portion, as 20 grains, to the action of ʒi. of ether at 65° for an hour, and collecting the residue, when, if mutton or beef fat be present, this will be detected by its tallowy odour when dry. There are other tests, as, for instance, the temperature at which the butter, melted alone at 212°, acquires solidity enough to sustain by its consistence a definite weight, adulterated butter acquiring such solidity at a temperature of from six degrees upwards higher than pure butter. The method of performing these experiments is fully detailed in the papers from which we are quoting.

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[1] Quarterly Journal of Science, April 1864.

[2] Chemical News, 1861-2.

V. There are two subjects which occupy a large portion of Mr. Simon's Reports to which we have not yet alluded. One of them is the state of vaccination in England, which we shall for the present defer; the other relates to the *influence of occupations upon health.* Neither will our space permit of our entering at any length upon this topic in the present article. It must suffice to say that Mr. Simon divides unhealthy occupations into two classes—namely, 1. those which are *naturally unwholesome,* and in which, except in so far as their natural unwholesomeness can be and is counteracted by artificial contrivances, the employed must suffer in health. Examples of these are found in the business of grinders and polishers of steel, china scourers and potters, cotton-carders, flax-workers, miners, &c., in which the constant inhalation of dust, often, sooner or later, induces pulmonary disease; the business of workers in deleterious substances or poisonous matters, as phosphorus in the case of match-makers, as arsenical green in the case of persons who make artificial leaves of flowers, and poisonous metals in the case of white-lead makers, and mirror silverers and water-gilders. 2. Those which are *not naturally injurious to health,* but become so by reason of the mode in which they are carried on, either at factories, in workshops or workrooms, or in the cottages or habitations of the people engaged in them; such are indoor occupations generally, straw plaiting, lace-making, and glove-making, for instance, where children are sent at a very early age to schools to learn the trade, and compelled to do a certain amount of task-work every day; button-makers, jewellers, and knick knack-makers, stocking-makers, and factory operatives pretty generally, printers, tailors, dressmakers, milliners, &c. In respect to the first class, there are many contrivances which, if adopted, would lessen the amount of the danger to workpeople. But Mr. Simon very properly points out that much of the danger has arisen from the extreme subdivision of the labour connected with the several branches of trade, so that often only one small portion of a business is effected by each hand employed. With some of these businesses there is reason to believe that if the several steps in the process of manufacture were carried on consecutively by the same person, the trade itself would lose much, if not the whole of its danger. It is the use of men and women as mere machines, instead of intelligent beings who can be taught to do more than one monotonous act, that has led to much of the evil existent in the first class of hurtful occupations. With respect to the second class, the evils arise mostly from the crowding together of the persons engaged in them, in small, close, hot, and unventilated rooms for long hours every day. Every now and then the public conscience is shocked by the occurrence of some sudden death under these circumstances, but the public in general only hear of such evils in exceptional instances, when a coroner's inquest is held, and a fuss is made about them for a week or two, and then the attention is diverted to something else. Yet the evil is every day, and every year, carrying thousands to premature graves. The time certainly has arrived for some Government interference in this matter. How far the law will meet it as it now stands, we shall discuss in a future article.

One more word and we have done. There are districts in England—not all manufacturing, however—in which the death-rate of young infants is four or five times that of other districts. For this there are two causes—one of these, which, however, Mr. Sargant disputes, is the defective sanitary arrangements of the residences of the poor. The other there is no question about whatever—it is the occupation of women in various branches of industry away from home; the result of which is that they leave their young infants to be neglected, improperly fed or starved, or to be lulled into a fatal sleep by opiates. Two-thirds or three-fourths of the children born to these women die in infancy. The death is registered as "*Debility from birth*," "*Premature birth*," &c. "Domestic obligation is outbidden in the labour district, and the poor factory woman, who meant only to sell that honest industry of hers, gradually finds that she has sold almost everything which other women understand as happiness." (Fourth Report, p. 35.) The English law does not profess to deal with an evil the root of which lies where this does. All that can be hoped for is that the employers of female labour will, on becoming aware of it, bring into active operation some of those methods which charity has devised for the care of the children of those mothers who devote to their service that time and that care to which their offspring has undeniably the first and most urgent claim.

The progress made towards improvement of the public health, the organizations in operation with that object, and the condition of our sanitary legislation, are parts of our subject which we must defer for a future article.

REVIEW II.

1. *Lehrbuch der Constitutionellen Syphilis für Aerzte und Hörer der Medicin.* Von HERMANN ZEISSL, M. et Ch. D., Professor an der Universität zu Wien, &c.—*Vienna*, 1864. pp. 432.

A Treatise on Constitutional Syphilis, for Practitioners and Medical Students. By H. ZEISSL.

2. *The Pathology and Treatment of Venereal Disease.* By F. J. BUMSTEAD, M.D., Lecturer on Venereal Diseases at the College of Physicians and Surgeons, New York. Second Edition.—1864. pp. 635.
3. *Notice of Pulmonary Lesions associated with Syphilis.* By W. AITKEN, M.D., Professor of Pathology in the Army Medical School, Netley.—1863.
4. *Case of Syphilitic Deposit in the Substance of the Heart.* By D. R. HALDANE, M.D., Physician, late Pathologist to the Royal Infirmary.—*Edinburgh*, 1862.
5. *On the Treatment of Syphilis and other Diseases without Mercury.* By C. R. DRYSDALE, M.D., &c.—*London*, 1863.

THE history of syphilis is as the history of a building whose foundation-stone was laid by John Hunter, whose architecture was planned and whose walls were begun by Ricord, and which now stands a substantial mark of the industry of a few workmen—Fournier, Rollet, Lee, and Zeissl. Many another craftsman has from time to time lent a hand in its construction, sometimes adding to, sometimes impeding the progress of the work, till at length the edifice has reached a height at which, though still incomplete, it is imposing and durable.

The publications of the French and English writers above mentioned have the advantage of priority, but we know that Professor Zeissl has been for several years past in the habit of teaching daily to students from all parts of the world the lessons which he has only just now thought fit to publish. Formerly assistant to Hebra—that most shrewd of observers, and most delightful of teachers—he has been constantly in the midst of syphilis, following it in all its stages, and watching it in all its forms. His book is what it professes to be, a work especially devoted to the consideration of syphilis. It does not treat at all of gonorrhœa: it pays comparatively little attention to the local non-syphilitic ulcer, merely discussing its nature so far as is necessary to show how totally distinct it is from syphilis; but it deals most completely with syphilis proper.

Professor Bumstead's book is a perfect compilation of all that is worth knowing on venereal disease in general. It is divided, in this edition, into three parts, which treat of gonorrhœa, chancroïd (local non-syphilitic ulcer), and chancre (primary manifestation of constitutional syphilis). It fills up a gap which has long been felt in English medical literature, by furnishing the English reader with a complete treatise on venereal diseases. The doctrines contained in it agree essentially with those of Zeissl.

With regard to nomenclature, it will be well to state at the commencement that the term *chancre* will be used to represent the true primary syphilitic affection; and the term *simple sore* for the purely local non-syphilitic ulcer. Zeissl employs the term chancre for the simple sore, and syphilis for the primary specific affection; but this is confusing to English readers, in whose minds chancre and syphilis are indissolubly connected. Again, Bumstead employs the word "chancroïd" for the simple sore; but this word was the origin of a faulty conception of the real nature of the sore, and was coined by Clerc, who supposes that the sore is the product of the inoculation of a chancre on one who is already syphilitic; that it is, in other words, a modified syphilis, just as varioloïd is a modified variola—a great error.

There are now recognised three distinct venereal affections, dependent on three distinct poisons: 1. *Gonorrhœa.* 2. *Simple sore*—a purely local affection, not infecting the system; derived always from a simple sore or bubo, and in its turn producing a simple sore when inoculated; communicable to the syphilitic and the non-syphilitic alike; capable of being repeated on the same person indefinitely, and therefore often multiple; having no period of incubation, but showing the effects of inoculation in a few hours, redness, and itching, soon followed by the formation of a pustule, which bursts and leaves a painful ulcer. The inguinal glands are often entirely unaffected; but if they be affected, one gland only, as a rule, swells, enlarges considerably, is painful, and tends to suppurate; the pus from this so-called bubo producing again, when inoculated, a simple ulcer like the predecessor. The ulcer is slow to heal, sometimes spreads and becomes phagedænic. With the healing of the sore, the disease is at an end; but it may recur any number of times in the same individual.

3. *Chancre* is the first manifestation of a constitutional disease—syphilis; is derived always from a chancre, or from the secretion of some later manifestation of syphilis (so-called secondary, probably, too, from tertiary affection), or from the blood and secretions[1] of a person affected with syphilis; is communicable only to the non-syphilitic, producing no effect whatever when inoculated on one that is syphilitic; cannot therefore be repeated on the same person, and is, as a rule, single; has a distinct period of incubation, from three to four weeks[2] on an average, during which time all signs at the point of inoculation disappear, till, at the end of the above period, there appears a papule, which gradually spreads in circumference, becoming at the same time indurated. This papule, in a few days—in some places sooner than in others—begins to exfoliate superficially, and secretes a scanty gummy substance, which, if the part be not exposed to friction, dries, and forms a crust that falls or is rubbed off, and leaves behind a disk-shaped, somewhat elevated prominence, cartilaginous to the touch, dull red in colour, and glistening as if varnished (firniss-

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[1] Semen and perhaps milk. Zeissl.

[2] Zeissl.

artig). The centre of this, after a time, softens and breaks down, so as to become slightly excavated or scooped out, and to give the appearance of an ulcer. This, however, may not be noticed, if the original lesion by which the disease was communicated was superficial—a mere abrasion, as is so often the case in connexion. The indurated mass varies in size from that of a pea to that of a bean; but it may involve the whole glans penis, or the whole of the circumference of the os uteri, or the whole of one labium. The inguinal glands, on one or both sides, become gradually enlarged and indurated, *that gland being first affected which is nearest the chancre*, and the others following in order, till Ricord's "Pléïade ganglionnaire" is formed, not painful, and not prone to suppurate. The chancre may occur, like the simple sore, in all parts of the surface of the body. It disappears slowly, the induration remaining sometimes for months, or, as some have observed, for years. It is followed, in from six to ten weeks from the time of the first appearance of the papule, by secondary symptoms. An individual once syphilitic is, as a rule, proof against a recurrence of syphilis; but, as in the case of the exanthemata, this is not invariable.

It may be asked, What means have modern observers employed, that they are able to lay down laws so entirely subversive of old doctrines? We answer, *inoculation*, and that not limited (which was the cause of Ricord's many errors), but practised largely and widely. This is the compass which has guided them amidst all the shoals and rocks of this most difficult question. No amount of clinical inquiry could have thus unravelled certain knots that entangled the subject. Herein, too, lies the reason why the French and Germans have gone ahead of us in this matter. Whether it be the English surgeon or the English patient who believes more implicitly in the maxim, *Fiat experimentum in corpore vili*, we know not; but certain it is that experimental inoculation of syphilitic virus on those who have never had syphilis would neither be suggested by surgeon nor tolerated by patient in any English hospital. It has been done, nevertheless, abroad, and that repeatedly, from a belief, no doubt, that great means must be employed to arrive at great ends.

Foremost among such experimentalists stand Waller of Prague, Danielssen of Bergen, Rollet of Lyons, and lastly, Hebra of Vienna.[1] A description of the results obtained by the latter is thus given by Zeissl, who himself assisted:

> CASE I.—"The secretion was taken from some mucous tubercles on the breast of a nurse, R——, on December 12th, 1861, and inoculated in two places on the right upper arm of the nurse herself, and of a man, K——, aged fifty, who was suffering from extreme prurigo, but had never had syphilis. While the inoculations on the nurse produced no effect, there appeared on the man, on December 28th, at each point of inoculation, a papular prominence, which was slightly painful when touched. On January 1st, 1862, both papules began to exfoliate slightly, and to secrete sparingly a sticky pus, which gradually dried,

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[1] We speak here only of true syphilitic inoculation on those who have never had syphilis, omitting mention of the thousands of non-syphilitic inoculations, which will be spoken of under Syphilization.

and on January 8th had formed a crust. This crust fell off at the end of ten days, and there appeared a shining red induration of the size of a silbergroschen. K—— was inoculated on January 8th a second time with the secretion of mucous tubercles taken from R——; this time, however, as was anticipated, without effect. On January 25th there appeared swelling of the axillary glands on both sides."

Case II. (He quotes from his private practice.)—"A young Viennese physician went to Venice on account of tubercle of the lungs. There he treated a soldier for a very suspicious-looking ulcer that was seated on the lower lip. In order to satisfy himself as to whether it was a chancre or not, he inoculated himself with the secretion of the ulcer on his left forearm, not being aware of the possibility of the contagion of general syphilis. As nothing appeared for some days, he was convinced that the ulcer was not virulent; but after about three weeks there appeared at the point of inoculation a reddish-brown, hard tubercle, and the cubital gland swelled considerably. Astonished at this, to him, inexplicable occurrence, the unadvised experimentalist came to me for advice, and I gave him the sad information that he must shortly expect an outbreak of general syphilis, as he had inoculated himself with the virus from an individual with constitutional syphilis. And so it really happened. In a short time he became affected with a papular syphilide."

The next important question, which for a long time past has been insisted on by Zeissl, is the occurrence of *twofold inoculation* (doppelte infection). He points out that the terms "chancre mixte" and "chancre mulet," employed by the French, are improper, as implying that there is a positive intermixture or blending of the two poisons to produce one effect. This, however, is not the case. It is quite possible that both poisons may be communicated at the same time in one intercourse; that the simple ulcer may appear and go through its regular course; that afterwards, at the expiration of about three weeks, an induration may gradually show itself at the base of the ulcer (the syphilitic virus, which has been incubating, beginning now to manifest itself); and that there may result simple sore + chancre. But here there has been no admixture of the two poisons: each has produced its proper effects in its peculiar way; only, from the fact that the same spot has served for the introduction of both, an apparent complication has been produced.

On the other hand, a person who has a chancre may have intercourse with another person who has a simple sore. In this case, there will appear in a few hours signs of the sore developing itself on the top of the chancre; the result here being chancre + simple sore. Nay, further, one of the indolent indurated glands in the groin, caused by the syphilis, may become inflamed by the additional virus of the simple sore, and there shall be a bubo in a syphilitic gland. If, now, the pus from this bubo, or from the sore, be taken and inoculated on another part of the same person, it will give rise to a simple sore; or, on another non-syphilitic person, it will produce the same effect, *provided that none of the blood containing the syphilitic virus be mixed with the pus.* This is most important in the history of syphilis, first, as showing how distinct the two poisons are; secondly, as a warning that the surgeon must be very careful in his prognosis. If a patient consult him with a sore of seemingly the most innocent character, he must not pronounce positively that no secondary symptoms will follow, but must wait a few weeks for the possible appearance of the syphilitic induration, which may be already dormant in the system. Cases of the above kind are related by Fournier[1] and Rollet,[2] the latter of whom has inoculated a healing chancre with virus from a simple sore, and has clearly produced a simple sore on a chancre.

Zeissl has cut chancres out of the dead subject, and examined sections microscopically. He finds the induration to be caused by proliferous development of cells in different stages, many of which cells are already in a state of fatty degeneration. In a section perpendicular to the surface the papillæ are seen close crowded together by abundant connective-tissue corpuscles. In a horizontal section there are seen numerous decussating fibrils of connective tissue, in the areolæ of which are imbedded connective-tissue corpuscles, some young, some degenerate. Bärensprung states that the granular substance at the base of a chancre gives the amyloïd reaction with iodine, and consequently regards the induration as a manifestation of constitutional syphilis, in that its behaviour, under the influence of this reagent, corresponds with that of the gummy tumour and other later manifestations of syphilis.

Although, up to a certain point, a believer in the cellular pathology, Zeissl questions Virchow's theory concerning the nature of the syphilitic diathesis,[3] that the virus stored up or encapsuled, as it were, in certain centres, is set free at intervals to poison the blood, and cause the well-known outbreaks of syphilis; and that, consequently, during the intervals of rest, the system generally is not syphilitic, but that the disease is strictly confined to those centres in which the poison is contained. To this Zeissl replies: How is it, then, that a syphilitic man will, during such an interval of rest, infect his wife, and have a syphilitic child? He thinks that the blood as well as the lymphatic system, having once undergone a specific change, remains so changed for life. He does not deny that swelling of the lymphatic glands is a proof that syphilis is still latent, but he does deny that the poison is localized in these glands. He also remarks that pigment-staining about the spot where a chancre has been, or about the seat of former syphilitic eruptions, is to be regarded with suspicion as a sign that the poison is still lurking in the system. The pages which treat of syphilitic eruptions are, as would be expected from Vienna, very elaborate.

Das spitze condylom, condyloma acuminatum, our *condyloma*, is generally believed to be never syphilitic. This is an error. It may germinate just as well on syphilitic as on non-syphilitic soil, whenever and wherever a proliferous cell-development takes place from the rete Malpighii. It not infrequently happens that a warty outgrowth springs from a mucous tubercle, and presents to the naked eye, or to one examining carelessly, exactly the appearance of the non-syphilitic wart (such as is caused by the irritation of gonorrhœa, &c.). The real nature of such a growth depends on the nature of its *basis.*

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[1] Leçons sur le Chancre. 1860. [2] Recherches sur la Syphilis. 1861.

[3] Cf. Virchow's Cell. Path. Transl. by Chance, p. 132.

The syphilitic affection of internal organs, *gummose geschwulst,* or *gummy tumour,* requires special notice. Virchow's description of these tumours is known to many.[1] They resemble, he says, most nearly young granulation tissue, and are formed by enlargement with hyperplasia of connective-tissue corpuscles, and softening of the intervening substance. After a time, the mass thus formed undergoes fatty degeneration in its centre, and breaks down into a tenacious synovia-like substance (whence the name). Wagner[2] regards them as distinct new formations, and gives the tumour the name of "syphiloma." Professor Aitken's pamphlet contains an account of several post-mortem examinations on soldiers who died with chronic syphilis, and in whom were found tumours of this kind occupying various organs of the body, but more particularly the lungs. Dr. Haldane relates a case of a prostitute who died suddenly: a number of deposits were found in the septum of the heart, which from their nature he supposes to be syphilitic gummata. Attention has also been recently called to the occurrence of such growths in various organs by Wilks,[3] Gambaco,[4] and others. Wagner's account of them is masterly, and his work will repay perusal.

A very interesting description of severe endemic syphilis follows. So terrible has been, at different times, the spread, and so severe the form of this disease, that various names indicative of its malignancy have been given by the stricken inhabitants ignorant of its nature. Thus the Radesyge, in Norway, 1720; and in Sweden, 1762; the Skerljevo, in Croatia, 1790; the Sibben, or Sibbens, in Scotland, at the time of Cromwell's invasion, were all instances of this. We have heard an excellent account of this matter from the lips of Professor Hebra, who visited Norway to inquire into the Spedalskhed, and was sent, in the year 1851, by the Austrian Government, to investigate the nature of the Skerljevo, which prevailed at that time. He spoke of this latter, and of the Radesyge, as being principally syphilis in various forms, hereditary and acquired, though both included some other diseases of the skin, lupus, &c.

Woe be to the wretch who falls into the hands of a believer in *syphilization!* We had occasion to see several times, both in Paris and Vienna, patients who had been thus treated, and whose arms, back, chest, and legs were pitted with innumerable cicatrices. Nor shall we easily forget one "misérable," who lay with an enormous phagedænic sore, involving the whole of one buttock and the upper part of the thigh—a consequence of inoculation. This syphilization, or indefinite multiplication of simple sores by inoculation, and therefore really no syphilization at all, has been tried at Vienna, as elsewhere on the Continent, and with the anticipated result—complete failure to cure syphilis, or to prevent its recurrence.

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[1] Uber die Natur der Constitutionellen Syphilitischen Affectionen. Archiv. 1858. Band xv. s. 320.

[2] Das Syphilom, oder die Constitutionelle Syph. Neubildung. Leipzig. 1863.

[3] Guy's Hosp. Reports, 1863. Vol. ix. p. 1.

[4] Cf. Med.-Chir. Review, Vol. xxxi. p. 39.

For the simple sore, the *treatment* required is purely local: early cauterization with the Vienna paste, or Canquoin's paste ("composed of equal parts chloride of zinc and flour, dried by heat, to which alcohol is added gradually till a paste is formed; this is spread on a thin layer of cloth, and again gently heated. A disk corresponding in shape to the ulcer is cut, and retained on the surface previously cleansed, from one to three hours, or in large and phagedænic ulcers, from five to six") and cleanliness. Mercury is useless. For syphilis proper, mercury given in moderate doses is a valuable remedy. It is not to be administered with the idea of *curing* the disease, as quinine cures ague, but it promotes materially the *healing* of the chancre and the removal of the induration: it acts more like a specific in removing most secondary symptoms; and there are certain forms of tertiary syphilis which sometimes yield rapidly to mercury after resisting iodine and all other remedies.[1] Most of those who have seen much of syphilis must have met with such pallid, cachectic miserable cases (the effect of syphilis, too, not of mercury) who are restored to new life, and increase rapidly in weight, under the influence of mercury. The above is the unprejudiced decision pronounced by Hebra and Zeissl, after giving a fair trial to all the different plans of treatment recommended by different writers. They made a series of experiments with extractum graminis (most expectant treatment); they next gave iodine a fair trial; they treated all syphilitic patients with subcutaneous injections of cold water; they tried syphilization; finally, they have come back to mercury. The form usually prescribed is the bichloride (hydrargyri corrosiv. sublimat. Ph. Br.) of which gr. $\frac{1}{8}$th is given daily, and, if necessary, increased to gr. $\frac{1}{6}$th; though this is seldom the case. Inunction is also practised by them; and a card may be seen hung up in their wards containing directions for inunction, and specifying the part of the body to be anointed on each day of the week. Both Zeissl and Bumstead speak highly of the efficacy of Lee's calomel vapour-bath.

Space forbids us to take up the cudgels with the antimercurialists. We hope that Dr. Drysdale's well-written pamphlet will have the effect of checking the indiscriminate use of hydrargyrum in all diseases, and of cooling the passion for that panacea, grey-powder, which has so long prevailed among practitioners in this country. But, speaking with a prophetic spirit, we doubt whether he or we shall live to see the day when mercury will be abandoned in the treatment of true syphilis.

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[1] See some very sensible observations by Wilks, loc. cit. p. 13.

REVIEW III.

History of the Intellectual Development of Europe. By JOHN WILLIAM DRAPER, M.D., LL.D., Professor of Chemistry and Physiology in the University of New York, &c. &c.—In two volumes, pp. 427, 417.—*London,* 1864.

SOME six or seven years ago we introduced Dr. Draper to the notice of our readers, as one not unfavourably known to the scientific world, by his labours in the sciences of chemistry and physics, particularly in those branches of them having special reference to biology. He has latterly taught physiology in the University of New York, and his treatise on 'Human Physiology, Statistical and Dynamical,' has been well received generally at the hands of the profession. When noticing this work, we specially referred to the last two chapters, as containing much interesting and instructive matter. It was pointed out that in the discussion "On the influence of physical agents on the aspect and form of man and on his intellectual qualities," the views of those who maintained the unity of the species, and the modifying influence of external agencies in giving rise to varieties of form and character, were unreservedly adopted. It was likewise shown that in the chapter entitled "Social Mechanics," a sketch of the history of modern civilization was given, as also of the various influences which have contributed to its development. These important topics were necessarily, however, touched upon in but a cursory manner. In 1860 the New York Professor paid this country a visit at the time of the meeting of the British Association for the Advancement of Science, held at Oxford that year. He then read a paper containing an abstract of the physiological arguments included in the present volumes respecting the mental progress of Europe, reserving the historical evidence for subsequent publication. The treatise recently placed in our hands contains this evidence, and is intended as the completion of the work on 'Human Physiology,' referred to by us on a former occasion. In this latter, man was treated of as an individual; in the present work he is considered in his social and complex relations. After these concluding portions were written some slight delay took place in their publication. Advantage was then taken to condense the somewhat voluminous accumulation, but we are told in the preface, that the discussion of several scientific questions (such as that of the origin of species, e.g.) which have recently attracted attention has remained untouched, the principles taught being the same as those presented in the former treatise of 1856. We purpose to give an analysis of the argument contained in these concluding volumes of Dr. Draper: a general critical examination of the vast and complex subject therein discussed, is in these pages quite out of the question. All that we shall attempt is to exhibit the salient doctrines of the author, and the addition of a few remarks on one or two prominent topics.

The first and great question which the author places before him for answer, is the following—viz. "Does the procession of nations in time go forward without reason or order, like the erratic phantasm of a dream, or is there a predetermined, a solemn march, in which all must join, ever moving, ever resistlessly advancing, encountering and enduring an inevitable succession of events?" The latter, he replies, is the case; for knowledge, both philosophical and scientific, proves that all mundane events are the results of the operation of *law*. Every movement in the skies, and upon the earth, proclaims to us that the universe is under government; and the more perfectly we understand the antecedents of passing events, the more plainly are they all seen to be the effects of physical conditions, and therefore the result of law. This holds good, whether we refer to the operation of law among living or lifeless things, in the organic as well as in the inorganic world. Nay, do not all our expectations of the stability of social institutions rest upon our belief in the stability of surrounding physical conditions? From the time of Bodin, who, nearly three hundred years ago, published his work 'De Republica,' this doctrine has been widely admitted —viz. That the laws of nature cannot be subordinated to the will of man, and that government must be adapted to climate. In the present economy of our globe natural agents are relied upon as the means of regulation and government. The permanence of organic forms is altogether dependent on the invariability of the material conditions under which they live, and any recognised variation in the material conditions is copied in the organic effects in vigour of motion, energy of life, intellectual power. To this doctrine of the control of physical agencies over organic forms the author refuses to acknowledge any exceptions, even in the case of man. He asserts that the varied aspects the latter presents in different countries are the necessary consequences of these influences, and that as regards the truth of this doctrine, it matters not whether the anthropologist advocate the theory of the unity of the human race, or that of the origin of the different races from different centres. Either must bring us to the admission of the transitory nature of typical forms, of their transmutations and extinctions. As regards man, it is not only complexion, development of brain and intellectual power which are thus affected, but with difference of climate there must be differences of manners and customs, that is, differences in the modes of civilization, and such differences being insolubly connected with political results. The ethnical element is therefore necessarily of a dependent nature, its durability arising only from its perfect correspondence with the conditions by which it is surrounded. Whatever can influence such correspondence touches its life. It is thus established by Dr. Draper, that groups of men or nations must be disturbed by the same accidents as influence the individual, and must complete the same cycle as he runs through, and thus, all over the world, physical circumstances may be said to control nations as they control the human race. The surrounding environments—

> "make the Australian a savage, incapacitate the negro, who can never invent an alphabet or an arithmetic, and whose theology never passes beyond the stage of sorcery. They cause the Tartar to delight in a diet of milk, and the

American Indian to abominate it. They make the dwarfish races of Europe instinctive miners and metallurgists. An artificial control over temperature, by dwellings warm for the winter and cool for the summer; variations of clothing to suit the season of the year, and especially the management of fire, have enabled man to maintain himself in all climates. The single invention of artificial light has extended the available term of his life by giving the night to his use; it has, by the social intercourse it encourages, polished his manners and refined his taste,—perhaps, as much as anything else, has aided in his intellectual progress. Indeed, these are among the primary conditions that have occasioned his civilization. Variety of natural conditions gives rise to different national types; artificial inventions occasion renewed modifications. Where there are many climates there will be many forms of men. Herein, as we shall in due season discover, lies the explanation of the energy of European life, and the development of its civilization.

"Would any one deny the influence of rainy days on our industrial habits, and on our mental condition, even in a civilized state? With how much more force, then, must such meteorological incidents have acted on the ill-protected, ill-clad, and ill-housed barbarian. Would any one deny the increasing difficulty with which life is maintained as we pass from the southern peninsulas to the more rigorous climates of the north? There is a relationship between the mean annual heat of a locality and the instincts of its inhabitants for food. The Sicilian is satisfied with a light farinaceous repast, and a few fruits; the Norwegian requires a strong diet of flesh; to the Laplander, it is none the less acceptable if grease of the bear, or train-oil, or the blubber of whales be added. Meteorology, to no little extent, influences the morals: the instinctive propensity to drunkenness is a function of the latitude. Food, houses, clothing, bear a certain relation to the isothermal lines.

"For similar reasons the inhabitants of Europe each year tend to more complete homogeneousness. Climate and meteorological differences are more and more perfectly equalized by artificial inventions; nor is it alone a similarity of habits, but also a similarity of physiological constitution that is ensuing. The effect of such inventions is to equalize the influences to which men are exposed; they are brought more closely to the mean typical standard, and —especially is it to be remembered—with this closer approach to each other in conformation, comes a closer approach in feeling and habits, and even in the manner of thinking." (vol. i. p. 25.)

"Through the darkness of fifty centuries we may not be able to discern the motives of men, but through periods very much longer we can demonstrate the conditions of nature. If nations in one sense depend on the former, in a higher sense they depend on the latter. It was not without reason that the Egyptians took the lead in Mediterranean civilization. The geographical structure of their country surpasses even its hoary monuments in teaching us the conditions under which that people were placed. Nature is a surer guide than the traces of man, whose works are necessarily transitory. The aspect of Egypt has changed again and again; its structure since man has inhabited it, never. The fields have disappeared, but the land remains.

"Why was it that civilization thus rose on the banks of the Nile, and not upon those of the Danube or Mississippi? Civilization depends on climate and agriculture. In Egypt the harvests may ordinarily be foretold and controlled. Of few other parts of the world can the same be said. In most countries, the cultivation of the soil is uncertain. From seed-time to harvest the meteorological variations are so numerous and great that no skill can predict the amount of yearly produce. Without any premonition the crops may be cut off by long-continued droughts, or destroyed by too much rain. Nor is it sufficient that a requisite amount of water should fall; to produce the proper effect it must fall at particular periods. The labour of the farmer is at the mercy of the winds and clouds; with difficulty, therefore, could a civilized state originate under such circumstances. . . . . There is a country in which man is not the sport of the seasons, in which he need have no anxieties for his future well-being—a country in which the sun-shines and heats vary very little from year to year. . . . Here agriculture was so precise that it might almost be pronounced a mathematical art. . . . . Agriculture is certain in Egypt, and there man first became civilized." (p. 80.)

In the same manner that the individual is liable to changes through the action of external agencies, and offers no resistance thereto, nor any indication of the possession of a physiological inertia, but submits at once to any impression, so likewise is it with aggregates of men constituting nations. The orderly process of the latter may be disturbed, according to Dr. Draper, in two ways: it may be disturbed exteriorly and interiorly. If, e.g., from its original seat a whole nation were transposed to some new abode, in which the climate, the seasons, the aspect of nature were altogether different, it would appear spontaneously in all its parts to commence a movement to come into harmony with the new conditions—a movement of a secular nature, and implying the consumption of many generations for its accomplishment. During such a period of transmutation there would, of course, be an increased waste of life, a risk, indeed, of total disappearance or national death; but the change once completed, the requisite correspondence once attained, things would go forward again in an orderly manner on the basis of the new modification that had been assumed. Again, by the interior disturbance of blood-admixture, a national type may be affected with more rapidity, the result depending on the extent to which admixture takes place. In one sense, too, the contamination of a numerous nation by a trifling amount of foreign blood-admixture would appear to be indelible. We must not, therefore, any longer regard nations, or groups of men, as offering permanent pictures. Human affairs must be looked upon as in continuous movement, though not as wandering here and there in an arbitrary manner, but as proceeding in a perfectly definite course. The life of a nation flows in a regular sequence, determined by inevitable laws; and hence, in estimating different nations, we must not be deceived by the casual aspects they present.

A national type pursues its way physically and intellectually through changes and developments answering to those of the individual, and being represented by Infancy, Childhood, Youth, Manhood, Old Age, and Death respectively. Thus Pascal was more than justified in his assertion, that "the entire succession of men through the whole course of ages must be regarded as one man, always living and incessantly learning."

According to our author, the intellectual progress of Europe will be found, on inquiry, to be like that which may be observed to have happened in the case of Greece. It has passed through certain periods or stages of development: the first may be described as the Age of Credulity, the second as the Age of Inquiry, the third the

Age of Faith, the fourth the Age of Reason, and the fifth as the Age of Decrepitude:

> "From the possibility of thus regarding the progress of a continent in definite and successive stages, answering respectively to the periods of individual life—infancy, childhood, youth, maturity, old age—we may gather an instructive lesson. It is the same that we have learned from inquiries respecting the origin, maintenance, distribution, and extinction of animals and plants, their balancing against each other; from the variations of aspect and form of an individual man as determined by climate; from his social state, whether in repose or motion; from the secular variation of his opinions, and the gradual dominion of reason over society—this lesson is, that the government of the world is accomplished by immutable law." (p. 19.)

As in the case of individuals so with states; whilst some pass scarcely beyond infancy, others die of mere old age. Many go on living contemporaneously; some make great progress in civilization, others but little advance; whilst several may exhibit characteristics which render it difficult to say to which nation the credit should be given of presenting the most perfect type. In an individual, life is maintained only by the production and destruction of organic particles, no portion of the system being in a state of immobility, but each part displaying incessant change. Death is therefore necessarily a condition of life, and the more energetic the function of a part—or if we compare different animals with one another, the more active the mode of existence—correspondingly the greater the waste, and the more numerous the deaths of the interstitial constituents. To the death of particles in the individuals, answers the death of persons in the nation of which they are the integral constituents. In both cases, in a period of time quite inconsiderable, a total change is accomplished without the entire system, which is the sum of these separate parts, losing its identity. Each particle, or each person, comes into existence, discharges an appropriate duty, and then passes away perhaps unnoticed. So nations, like individuals, die:

> "Their birth presents an ethnical element; their death, which is the most solemn event that we can contemplate, may arise from interior or exterior causes. Empires are only sandhills in the hour-glass of Time; they crumble spontaneously away by the process of their own growth. A nation, like a man, hides itself from the contemplation of its final day; it occupies itself with expedients for prolonging its present state. It frames laws and constitutions under the delusion that they will last, forgetting that the condition of life is change: . . . . . but nations are only transitional forms of humanity; they must undergo obliteration, as do the transitional forms offered by the animal series. There is no more an immortality for them than there is an immobility for an embryo in any one of the manifold forms passed through in its progress of development." (p. 16.)

We have now placed sufficient before the reader to show him that the main doctrines advocated in the work before us are—that social advancement is as completely under the control of natural laws as is bodily growth; that the life of the individual is a miniature of the life of a nation; and that the individual is the product of climatorial conditions or surrounding physical environments. Hence, according to the author, history must be viewed through the medium of physiology, for it is thus only that we can gain a just and thorough appreciation of the origin and nature of the thoughts and motives of men in successive ages of the world. Hitherto, however, no one has undertaken the labour of arranging the evidence offered by the intellectual history of Europe in accordance with physiological principles, so as to illustrate the orderly progress of civilization, nor collected the facts furnished by other branches of science, with a view of enabling us to recognise clearly the conditions under which that progress takes place. The deficiency, then, Dr. Draper endeavours to supply in his 'History of the Intellectual Development of Europe.'

In working out his great problem, after discussing the question of the government of nature by laws, and demonstrating that man is the archetype or example of society, the author proceeds to examine the intellectual history of Greece. This is a nation offering the best and most complete illustration of the life of humanity. It is shown that from the beginnings of its history in old Indian legends, and of its philosophy in Ionia, it passed through phases like those of the individual until its decrepitude and death in Alexandria. After a digression on "the history and philosophical influences of Rome," as a preparation for resuming the examination of the intellectual progress of Europe, the history of the latter is proceeded with in detail. In this consideration arbitrary epochs are assumed answering to the periods from infancy to maturity. History, it is maintained, justifies the assumption of such epochs:

> "There is a well-marked difference between the aspect of Europe during its savage and mythologic ages; its changing, and growing, and doubting condition during the Roman republic and the Cæsars; its submissive contentment under the Byzantine and Italian control; the assertion of its manhood and right of thought, and freedom of action, which characterize its present state—a state adorned by great discoveries in science, great inventions in art, additions to the comforts of life, improvements in locomotion and the communication of intelligence. Science, capital, and machinery conjoined, are producing industrial miracles. Colossal projects are undertaken and executed; and the whole globe is literally made the theatre of action of every individual."(p. 882, vol. ii.)

The first epoch coming under review is that of "the European age of Inquiry," in which the rise, early variations, conflicts, and final establishment of Christianity are witnessed, and during which the progressive variation of opinions is seen to be closed by the institution of Councils and the concentration of power in a pontiff. The second epoch is that of "the European age of Faith." In its consideration are embraced the "Ages of Faith," both of the east and of the west, and a history of the three attacks on the Italian system by the northern or moral assault, the western or intellectual assault, and by the eastern or military. The overthrow of the former by a combination of the two latter systems is illustrated; and the whole closes with a general review of the intellectual condition of the Age of Faith. We thus arrive at the "approach of the Age of Reason in Europe," preceded by maritime discovery and by the rise of criticism. Its consideration involves such important topics as those of the rejection of authority and of tradition, the Reformation, the adoption of scientific truth, the discovery of the position of the earth in the universe, the history of the former, and of its successive changes in the course of time, the nature and relations of man, and the union of science and industry. The whole closes with a contrast of the Ages of Faith and Reason, in which it is remarked:

> "In the former, if life was enjoyed in calmness, it was enjoyed in stagnation, in unproductiveness, and in a worthless way. But how different in the latter! Everything is in movement; so many are the changes we witness even in the course of a very brief period, that no one, though of the largest intellect, or in the most favourable position, can predict the future of only a few years hence. We see that ideas which yesterday served us as a guide die to-day, and will be replaced by others, we know not what, to-morrow." (p. 377, vol. ii.)

The concluding chapter of the volumes touches on "the future of Europe;" this we shall afterwards refer to. Suffice it here to let Dr. Draper say, that

> "Europe is now entering on its mature phase of life. Each of its nations will attempt its own intellectual organization, and will accomplish it more or less perfectly as certainly as that bees build combs, and fill them with honey. The excellence of the result will altogether turn on the suitability and perfection of the means." (p. 383, vol. ii.)

Such is an outline of the thesis and the method of its discussion undertaken by the Professor of Physiology in the University of New York. Whilst giving the author credit for his systematic exposition and arrangement of a great amount of instructive and interesting matter capable of affording *primâ facie* much support to the views he maintains, we cannot but think that he is much less *original* in these views than he himself supposes. He has rounded certain ideas—if we may use the expression—more completely, perhaps, than others have done, and has preserved a singleness of aim and purpose in a particular direction throughout his historical inquiries, which direction others have not so continuously followed. But we cannot see anything new in a single proposition of which the theory is built up—the doctrine of invariable law resulting in inevitable sequence, and this, not truly inconsistent with the feeling of freewill in the relation of law to thought and action in man; the feasibility of a scientific or deductive study of History and Sociology; the representation of the mass in the microcosm of the man; the influence of climate and surrounding environments on ethnical elements; the theories of development in form; of progressive improvement in time; of the appearance of incisive epochs during historic change, and of a better future resulting from a more generalized organization and development of the intellect proper,—are all so many doctrines which have been before and repeatedly taught. From Hippocrates to Buckle, through Cicero, Fontenelle, Chardin, Dubos, Bodin, Montesquieu, Filangiere, Comte, Quetelet, Prichard, Rotteck, &c. &c., these views have been made to bear on the social position of man. To name the metaphysicians, physicists, and naturalists who have argued out each separate hypothesis in its intrinsic character, is quite unnecessary. To Mr. Buckle and Dr. Prichard, however, in particular, we should refer as being the keystones of the arches supporting our author's historic edifice. The latter is carried up, no doubt, a goodly height, and is well decorated. We need scarcely say that, as the doctrines in question have all long been maintained, so they have been over and over again objected to, and this from the question of freewill and necessity down to that of a *scientific* consideration of history being possible.[1] We ourselves are certainly at issue with one of the most fundamental of Dr. Draper's biological doctrines. He would seem to lay almost everything at the foot of *climate* (we use the term in its widest sense, of course), and to ignore *race*. This we cannot agree to. Much of this theory, as we have already said, comes down to us from the time of Hippocrates, who, in his book Περὶ Ἄερον Ὑδατων καὶ Τόπων goes to the extent of affirming even that "changes of the seasons, which are very great and frequent, ... are likely to have an effect upon generation in the coagulation of the semen, as this process cannot be the same in summer as in winter, nor in rainy as in dry weather; wherefore I think that the figures of Europeans differ more than those of Asiatics, and they differ very much from one another as to stature even in the same city."[2] In modern days the belief in the transmuting influences of climate has been carried to a ridiculous extent. Barton Smith predicted that in time the European races located in North America would gradually degenerate into the Red Indian. Dr. Draper is a strong believer in the theory of the unity of the human race, and regards all modifications of the latter as due to surrounding environments; we cannot unhesitatingly accept these views. M. Guizot, in his 'History of the Civilization of Europe,' writes:

> "If we regard the immediate influence of climate upon men, perhaps it is not so extensive as has been supposed. But the indirect influence of climate, that which, for example, results from the fact that in a warm country men live in the open air, while in a cold country they shut themselves up in their houses; that in the one case they nourish themselves in one manner, in the other in another, these are facts of great importance; facts which, by the simple difference of material life, act powerfully upon civilization."

Another well-known author, whose work has recently been laid before the English public—viz., Dr. Waitz—maintains that the "race-type may, by the influence of climate, aliment, mode of life, and social condition, be slowly and to some extent only, altered."

That the bodies and minds of men are generally influenced by the physical conditions in dispute, we must perforce admit. But the question is, To what extent are they so influenced? and is there not a limit to the deflection, and where the potentiality of *race* in the history of society plays a more prominent part? Dr. Draper appears to place scarcely any restriction to the effects of climate, but admits that

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[1] See in particular 'Limits of Exact Science as applied to History,' by Professor Kingsley; and the 'Study of History,' by Professor Goldwin Smith.

[2] Adam's Translation of Hippocrates, vol. i. p. 218.

"When the change to be accomplished is very profound, involving extensive anatomical alterations, not merely in the appearance of the skin but even in the structure of the skull, long periods of time are undoubtedly required, and many generations of individuals are consumed." (Vol. i. p. 14.)

Most truly; for so far back as history carries us, the species of animals, as we call them, have not changed, the races of men have been absolutely the same. They were distinct then for that period as at present. On the banks of the Nile still wander in considerable numbers, the descendants of men who built the pyramids and carved the Sphynx and Memnon. The Coptic blood still lingers in the land, as if awaiting the return of an Amenoph or Sesostris. On the tombs of Egypt, the most valuable of all existing records, there stand the Negro, the Jew, the Copt, the Persian, the Sarmatian, nearly as we find them still. Different races of men are sketched on the walls of the tomb opened by Belzoni, showing that the characteristic distinctions of races were as well marked three thousand years ago as now. The Negro and other races existed then precisely as they are at present. If a pure race has appeared to undergo a permanent change, when transferred to a climate materially differing from its own, such change will be found on closer inquiry to be delusive.[1] Besides the well-depicted figures of Negroes in Egyptian tombs, the same people are painted on Etruscan antiquities. Amongst the fine Etruscan vases in the British Museum are some dating from about the third century before Christ, which are in the form of the Negro head, with the woolly locks painted thereon, or have the figures of Negroes amongst forms delineated upon their surfaces. The latter have been more distinctly marked by the artist scattering black knobs over the head to represent the little woolly curls of the race in question. From the investigations of Mr. Birch, one of the first Egyptologists, we learn that there are traces of a connexion between the Egyptians and Negro races during the 11th and 12th dynasties, 24 centuries before the Christian era. And although the delineations of Negroes, in the paintings, are not so old as this, not ascending higher, perhaps, than the 15th century before Christ; yet this lapse of between three and four thousand years is quite long enough to dispose in our minds of the ethnological problem of the variation of races in time. This discovery of Mr. Birch, says a writer in the 'Westminster Review' (for April, 1856), is, beyond question, one of the greatest steps taken in ethnological science—in the forcible language of Morton, "the physical or organic characters which distinguish the several races of man are as old as the oldest records of our species." The Portuguese and Spaniards, settled for two or three centuries in South America retain their chief physical, mental, and moral characteristics. The Dutch boers, at the Cape, and the descendants of the early Dutch settlers in the Moluccas, have not lost the features or the colour of the Germanic races; whilst the Jews, scattered over the world in the most diverse climates, retain everywhere what must be considered as their essential and characteristic lineaments. Further, recent discoveries have proved that, in the case at least of the American aborigines, the mound-builders of the Mississipi Valley and the dwellers on Brazilian Mountains had still in the very infancy of the human race, the same characteristic type that now distinguishes them.[1]

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[1] The Races of Men: a Fragment. By Robert Knox, M.D. (*passim.*)

We are fully aware that the question of human races is one which it is almost hopeless to expect will ever be considered in an unprejudiced manner. Unity and disunity, effects of climate and permanency of form, are the war-cries of parties. Some of the deepest problems of religion and politics are so generally assumed to be necessarily mixed up with the theory of race, that its dispassionate investigation cannot be looked for until this error be abandoned. And when will it be? Do men ever abandon their religious and political biases so long as they can hold to them? Without going to the whole extent of the late Dr. Knox's views upon the question of race, we would endorse some of them most certainly.

> "The races of men, as they now exist on the globe, constitute a fact which cannot be overlooked. They differ from each other widely, most widely. But that such differences exist, and important ones too, has not been denied; the word race is of daily use, applied even to man; since the war of race commenced in continental Europe and in Ireland, no expression is of more frequent occurrence than the term race. . . . . With me, race or hereditary descent is everything—it stamps the man. . . . . The illustrious Prichard, with the best intentions in the world, has succeeded in misdirecting the English mind as to all the great questions of race. This misdirection has told, as we have seen, on the scholar and on the scientific man. As a consequence of its misdirection, on the mere mention of the word race, the popular mind flies off to Tasmania, the polar circle, or the land of the Hottentot. Englishmen cannot be made to believe, can scarcely be made to comprehend, that races of men differing as widely from each other as races can possibly do, inhabit not merely continental Europe, but portions of Great Britain and Ireland. And next to the difficulty of getting this great fact to be admitted one, has been an unwillingness to admit the full importance of race, militating as it does against the thousand and one prejudices of the so-called civilized state of man, opposed as it is to the Utopian views based on education, religion, government. . . . . To me the Caledonian Celt of *Scotland* appears a race as distinct from the Lowland Saxon of the same country as any two races can possibly be—as Negro from American, Hottentot from Caffre, Esquimaux from Saxon. But statesmen, historians, theologians have not only refused to acknowledge the importance of this fact, they have gone farther, they have denied its existence. . . . . . Does an *émeute* take place? see with what anxiety it is attempted to be shown in Parliament that it is not a fight against race! All in vain! The terrible question cannot be concealed any longer. The savage rule of the Tedeschi will no longer be endured in Italy; the Saxon German detests the Slavonian, who repays his hatred with defiance."[2]

We agree with Dr. Knox when he maintains that climate has no influence in *permanently* altering certain varieties of men. Destroy them it may and certainly does, but it cannot convert them into any other permanent variety.

[1] The Origin of Human Races and the Antiquity of Man, deduced from the Theory of "Natural Selection," by Alfred W. Wallace, F.Z.S. (Anthropological Review, for May 1864.)

[2] The Races of Men; a Fragment. By Robert Knox (*passim*).

"Nor can this be done even by Act of Parliament, which to a thoroughgoing Englishman, with all his amusing nationalities, will appear as something amazing. It has been tried in Wales, in Ireland, in Caledonia—and failed. Explain it, ye Utopians, as ye choose; I merely mention the fact. When I lectured in Liverpool, a gentleman of the name of Martineau put forth a discourse, in which he maintained that we had forced Saxon laws upon the Irish too hurriedly—that we had not given them time enough to become good Saxons, into which they would be metamorphosed at last. In what time, Mr. Martineau, do you expect this notable change? The experiment has been going on already for 700 years; I will concede you seven times 700 more; but this will not alter the Celt, no more will it change the Saxon. . . . . . There has been no amalgamation of the Celtic and Saxon races in Ireland: they abhor each other cordially. When I publicly asserted this some years ago, I was as publicly contradicted. I call on those persons now to say whose opinion was the correct one. The Irish Celt is as distinct from the Saxon as he was seven hundred years ago. There is no mistaking the question now. . . . As the origin of these races is lost in the past, I trace them from the present towards the past—from the partially known to the totally unknown." (*op. cit.*)

Whilst we oppose the doctrine that climate can, as it were, make a new race, and reduce the differences of all human varieties into a homogeneousness of form and character, to be regarded as a sort of factor of any particular climate, we must at the same time protest against extreme views in favour of the hybridity of man. The observations of our author on "interior disturbance by blood-admixture," at pp. 14, 15, lead us to assume that he would proceed in this respect much beyond the limit at which we should be arrested. To use the words of Mr. Carter Blake, in the preface to his recent translation of M. Broca,[1] "We have been so often told that all races of men have been demonstrably proved to be fertile *inter se*, that many have conceived that the laws regulating this presumed fertility are ascertained and fixed beyond the reach of disproof or even of doubt." But "the public mind is so little acquainted with the real facts relating to the hybridity of the races of man, that its investigation, *non ex vulgi opinione sed ex sano judicio*, is necessary to the efficient progress of our science." This has been done by M. Broca, whose conclusion is as follows:

"After having rendered, if not quite certain, at least extremely probable, that *certain* human crossings are eugenesic, we have inquired whether *all* human crossings are in the same condition. From the documents collected, it results that *certain* human crossings yield results notably inferior to such as constitute in animals eugenesic hybridity. The whole of the known facts permit us to consider as very probable that certain human races, taken two by two, are less homœogenesic; than as, for instance, the species of the dog and the wolf. If we are to make any reservation, and leave some doubts upon this conclusion, it is that we cannot admit without numerous verifications a fact which definitively demonstrates the plurality of human species—a fact, by the presence of which all other discussion is rendered superfluous—a fact, finally, of which the political and social consequences would be immense." (p. 66 *op. cit.*)

Further, we conceive that in this great question of the advance of civilization, two things extremely different are very apt to be considered as the same thing. These are, the theory of development in time, and the doctrine of human progress. Many would deny a general progress in time, if by progress be meant improvement as regards all animals. Some, at least, of the extinct organic world were equal, if not superior to those now existing. Man was *possibly* amongst them also. M. Morel, a recent writer,[1] though rejecting any formal consideration of the question, whether humanity, *as a whole*, is in a state of progressive degeneration, leaves, from the general tenour of his remarks, an impression upon our minds that he inclines to the opinion that it is. M. Morel observes:

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[1] On the Phenomena of Hybridity in the Genus Homo, by Dr. Paul Broca. London, 1864.

> "The constant increase in Europe, not only of mental alienation, but of all those abnormal states which have special relations with the existence of physical and moral evil in the world, was likewise such a circumstance as could not fail of arresting my attention ..... add also that neuroses—such as hysteria and hypochondriasis—often attended by a tendency to suicide, now attack (and in alarming proportion) both the working and agricultural classes, whilst before they seemed almost the exclusive appanage of the rich and *blasée* .... the continued increase of suicide, of crimes against order and law, or else against the person, the monstrous precocity of young criminals, and the degeneracy of the race which, in many localities, can no longer fulfil the conditions required for military service, are irrefragable facts. They prove in unmistakeable terms that the anxiety of European governments has not been excited without cause." (*op. cit.*)

But it may be said (leaving out of question the theory of physical development) that the advance of civilization, human progress, and intellectual development are not exactly the same things. We presume not, seeing how these terms are employed, to indicate the present condition of the world, and then comparing it with the state of the past. Dr. Waitz, to whom we have before referred,[2] for example, writes:

> "We assert, in opposition to the usual theory, that the degree of civilization of a people or of an individual is exclusively the product of his mental capacity; that his capacities, which designate merely the magnitude of his performances, depend on the degree of cultivation which he has already reached." (vol. i. p. 324.)
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> "We hear," says Dr. Knox (*op. cit.*), "kind-hearted men speak of the progress of mankind! What progress do they mean? .... Look at Europe at either bank of the Danube, at Northern Africa, at Egypt, at the shores of the Mediterranean generally, and say what progress civilization has made in these countries since the decline of the Roman Empire. Is Ireland civilized? What is its state at this moment? .... One thing I admit, and that only, that the later races which threaten to (and which, I think, must) become the dominant ones, show energies and combinations for a purpose, mechanical applications, and diffusive efforts, which no race before them ever showed; in every other quality they are evidently inferior..... 'European civilization' seems a philosophical enough term, but to me, at least, it conveys no clear ideas;—and when I am told that of two nations closely adjoining each other, equally civilized, equally favoured by climate and external circumstances, living under regular

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[1] Traité des Dégénérescences, Physiques, Intellectuelles, et Morales, de l'Espèce Humaine, &c. Paris, 1857.

[2] Introduction to Anthropology, by Dr. Theodore Waitz. Translated for the Anthropological Society of London.

> governments for many hundred years, the one uniformly respects and advocates the law, the other as uniformly despises and violates it: that the one loves war, the other peace: that the one fences in and fortifies its towns, converting its metropolis into a vast fortress, bristling with cannon and bayonets; the other runs the streets of its wealthiest town quite into the open country, fills up the fosse of its remaining bastile (the Tower of London), converting the horrid excavation into a pleasant garden: that the one nation is Protestant and tolerant, the other Catholic, fanatic, and persecuting;—then I must not be told that distinctions so wide as these—differences seemingly insurmountable—are the mere effects of accidental circumstances; that these races may be spoken of in the abstract as the branches of one great family, who would never have differed had no sea divided them."

Just before the outbreak of the American war, a Minesota paper stated that the Indians in that part of the country were becoming rapidly civilized, for all in the neighbourhood of the settlements drank whisky, chewed tobacco, lied, stole, and swore as badly as the white men. It also added—"The other day a young squaw committed suicide, by hanging herself on a tree, on account of a disappointment in love." We have now before us an abstract from an introductory lecture (published in the 'Medical Times') by Dr. Walshe, in which the following remarks occur:

> "If we shudder at the monstrous depravity revealed in the historical portions of the Old Testament, if we turn to the Sixth Satire of Juvenal, to the works of Catullus, Martial, and Petronius—scan there the state of public morals at the outset of Rome's decline—look over the collection of ancient works of art in the Museo Borbonico, and learn from both written and chiselled documents, that vice was literally deified in that degenerate day. If we do this, we for a moment swell with a portion at least of the self-sufficiency of the Pharisee, and thank God we are not as those men of old. But stay—take away the coarseness of expression, the grossness of idea, and can we not find a literature of the present hour which equals in intrinsic licentiousness, and displays as profound social demoralization, as that recording the iniquities of the early Jew, or the corruption of the falling Roman? Does not the modern French novel fulfil these conditions?"

It may be replied, that all this is very true; that, unquestionably, we have vice and crime rampant amongst us, with French novels, Holywell-street literature, and obscene photographs. That poisonings, murderings, and prostitution prosper, and that there are not wanting swindlings of the utmost magnitude and of the most *recherché* character. That witches exist, fortune-tellers prosper, and that cunning men and women continue to "tell the stars." It will be admitted, too, that with all this we are scarcely less chary of infanticide than are our Chinese brethren, that there are yet Austrian and Italian dungeons, and that Roman brigands feel but little compunction in cutting off their prisoners' noses and ears. It will not be the less readily conceded that both "wars and rumours of wars" everywhere abound; that—

> "The preparation of weapons of war of tremendous range and power is the passion of the day. The latest discovery is eclipsed by the next, and the patent of to-day superseded by another of to-morrow. This does not look

as if nations had confidence in commercial treaties, pledges, and guarantees of peace."[1]

But then it will be also added that the word "civilization" must not receive any limited application, that the vast amount of good which exists must be balanced against the evil, and that if we have all the vices of the past, we certainly possess more virtues than it did. This, we presume, is the true solution of the difficulty. Civilization does not, therefore, necessitate a diminution of evil, but only a superaddition of good. Be it so:

> "Whether the earth be over-populated or not, one thing is certain—the strong will always grasp at the property and lands of the weak. I have been assured that this conduct is not at all incompatible with the highest moral and even Christian feeling. I had fancied that it was, but I have been assured of the contrary. The doctrine which teaches us to love our neighbours as ourselves is admirable, no doubt; but a difficulty lies, somehow or other, in the way. What is that difficulty which all seem to know and feel, yet do not like to avow? It is the difference of race." (Knox, *op. cit.*)

M. About, the well-known author of "La Question Romaine," tells us in his recent work on 'Progress,'[2] that a distinctive trait of this age is the rapidity with which any valuable invention is brought into general use, spread over the whole earth, and then superseded by something more useful and still more complete. The progress of society, says he, tends towards the formation of a vast European association, in which each member will labour for the advantage of himself and of the others. A beginning has been made by the establishment and success of the various international exhibitions. It is admitted, however, that many years must elapse before men will act as if conscious that, in respecting the rights of each other, they are obeying a law of nature. At present nations and individuals associate themselves together with a view to gain personal advantage to the detriment of the others. When the Treaty of Commerce was concluded the French fondly hoped that, by means of it, they would enrich themselves and ruin the English. The English entertained an equally charitable hope. Both have grumbled, because both have profited and neither has been ruined. M. About's ideal of progress, and of the maximum of happiness here below, is that human life should be protracted to its attainable natural limit, that the earth should be made to nourish as many men as it can contain, and that men should become as perfect and as happy as they possibly can be. The perfection of which man may dream, and perhaps attain, consists in the entire and harmonious development of his physical and moral being. Whoever shall have combined in his own person, in proper equilibrium, mental and physical health, vigour, and beauty, is perfect. To sacrifice the mind to the gratification of the physical appetites is to sink to the level of a brute. To destroy the body by inches in order to develope the mind, is to act like a madman. He is truly wise who rejects no kind of happiness, but strives to augment it in himself, and among his neighbours. Thus far M. About.

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[1] The Destiny of Nations as indicated in Prophecy. By the Rev. John Cumming, D.D., F.R.S.E. London, 1864.

[2] Le Progrès. Par Edmond About. Paris, 1864.

In his chapter on "The Future of Europe," Dr. Draper lays it down that though "forms of government" are of moment, yet they are not so in the manner commonly supposed. Their value increases in proportion as they permit or encourage the natural tendency for development to be satisfied. The promotion, then, of "a national organization of intellect" is the basis of human progress, and the basis of the former is "universal and, if necessary, compulsory education." In the more enlightened places, the movement onwards has already nearly reached this point.

> "Already it is an accepted doctrine that the State has rights in a child as well as its parent, and that it may insist on education; conversely also, that every child has a claim upon the Government for good instruction." (p. 387, vol. ii.)

After providing in the most liberal manner for the latter, free countries have but one thing more to do for the accomplishment of the rest; that is, to secure intellectual freedom as completely as the rights of property and personal liberty have been already secured. The attainment of this is, indeed, the Τὸ καλὸν of a nation's advancement. And wherein would appear to lie the great stumbling-block to its attainment? In the *odium theologicum!* Here rises up again the old quarrel between "Reason and Faith, their claims and conflicts." Dr. Draper observes:

> "There is no literary crime greater than that of exciting a social, and especially a theological odium, against ideas that are purely scientific, none against which the disapproval of every educated man ought to be more strongly expressed. The republic of letters owes it to its own dignity to tolerate no longer offences of that kind." (p. 387, vol. ii.)

Alas! but a few months have passed since the "republic of letters" in the most lettered kingdom of the world received a blow of the kind here alluded to, which, if that blow could have "struck home" in the way it was intended to have done, would have soon settled the question of the "national organization of intellect." We became possessed of the knowledge of this fact in the following way. Having occasion to refer to a subject which we considered might be found to be treated in a scientific, truthful, and unprejudiced way in the well-known Roman-Catholic 'Home and Foreign Review,' we learnt to our disappointment, on inquiry for the number, that our contemporary had "stopped"—in fact, we were told, "had been stopped by authority." The last number (April, 1864) which we became possessed of made us acquainted with the secret of its decease, and which we will communicate as follows. It should be remembered, then, that the distinctive feature of the 'Home and Foreign Review' was, that it endeavoured to exhibit Religion and Science in union, and the interest which became attached to its views proceeded from the fact that they were put forward as essentially Catholic in proportion to their scientific truth, and as expressing more faithfully than even the voice of authority the genuine spirit of the Church in relation to intellect. The object of our contemporary was to elucidate the harmony which exists between religion and the established conclusions of secular knowledge, and to exhibit the real amity and sympathy between the methods of science and the methods employed by the Catholic Church. That amity and sympathy the enemies of the Church we know refuse to admit, and certain of her friends, we now learn, have not yet come to understand. Long disowned by a large portion of the Roman episcopate, this amity and sympathy have at length been openly rejected by the Holy See. So recently as the 21st of December, 1863, the Holy Father addressed a Brief to the Archbishop of Munich, which was published by the latter in March, 1864. This brief bore special reference to the recent Congress at Munich, and to the doctrines of Froehschammer, approving the acts of the former, and censuring the latter, at the same time striking a blow through Froehschammer at the whole of the Catholic scholars of Germany. In attempting this *coup* it was believed that, if successful, an easy supremacy would be obtained over the Catholic *literati* and *savans* of all other nations. The Brief dogmatically asserted that, in the present condition of society, the supreme authority in the Church is more than ever necessary, and must not surrender in the smallest degree the exclusive direction of ecclesiastical knowledge; that an entire obedience to the decrees of the Holy See and the Roman Congregations cannot be inconsistent with the freedom and progress of secular science. In a word, it authoritatively affirmed that the common opinions of Catholic divines ought not to yield to the progress of secular science.

> "Quamvis enim naturales illæ disciplinæ suis propriis ratione cognitis principiis nitantur, Catholici tamen earum cultores divinam revelationem veluti rectricem stellam præoculis habeant oportet, qua prælucente sibi a Syrtibus et erroribus caveant, ubi in suis investigationibus et commentationibus animadvertant posse si illis adduci ut sæpissime accidit ad ea proferranda quæ plus minusve adversentur infallibili rerum veritati quæ a Deo revelatæ fuere . . . . Neque omittas omnibus inculcare ut profanas omnes novitates diligenter devitent neque ab illis se decipi unquam patiantur qui falsam scientiæ libertatem, ejusque non solum verum profectum sed etiam errores tamquam progressus impudenter jactant. Atque pari studio et contentione ne desinas omnes hortari ut maxima cura et industria in veram Christianam et Catholicam sapientiam incumbant, atque uti par est in summo pretio habeant veros solidosque scientiæ progressus qui sanctissima et divina fide duce et magistra in Catholicis scholis habiti fuerunt utque theologicas præsertim disciplinas excolant secundum principia et constantes doctrinas quibus unanimiter innixi sapientissimi doctores immortalem sibi nominis laudem et maximam Ecclesiæ et scientiæ utilitatem ac splendorem proferunt. Hoc sane modo Catholici viri in scientis excolendis poterunt."

Shortly after the appearance of the Brief (from which the above is an extract, and which will be found printed *in extenso* in the April number of our defunct contemporary), the 'Home and Foreign Review' was called upon to submit to authority, and to close its pages. This it preferred doing instead of continuing a course in face of a power to which it considered itself bound to yield. For a fuller explanation of the reasons, however, which inclined it so to do, we must refer to the concluding number (April, 1864) of the 'Review' itself, where, under the head of 'Conflicts with Rome,' a history of the whole subject will be found, which cannot fail of being read with *melancholy* interest. The Brief in question, after all, only inculcates the same doctrines which had been enunciated a few years before by the German prelates assembled at Würzburg, in 1848, and afterwards adopted by the apologists of the Austrian Concordat.

> "Amongst the rights of the Church, the Divine right of instruction and education comes from above. That right can never be separated from the charge 'to teach all nations,' nor can it be severed from the consciousness of liberty in the fulfilment of this mission. All ages and all parts of the globe attest that the bearers and instruments of this great commission have not shunned either labour, or danger, or suffering, or death, in the free exercise of the charge confided to them. The proof of the Divine right of the Church to educate the human race is demonstrated by the fact that *she embraces the totality of the mind of man with all its strength—its activity*—and shapes it to the eternal objects of humanity. The necessary consequence of this essential right is that the Church is to enjoy all that is required for the discharge of it—the free selection of all persons, corporations, and books employed in education, and a full power of supervision, correction and removal over them."[1]

How far the "intellectual development of Europe" will be prospered if this assertion that the Church of Rome "embraces the totality of the mind of man" be developed into vitality and practical application, we leave our readers to decide. We may simply and in conclusion express our opinion that we shall be greatly surprised to find that these doctrines of the *Gesu* and *Minerva* have any influence in restraining the free and learned minds of an important school of the Catholic divines of Germany from continuing their inquiries.

REVIEW IV.

Statistical, Sanitary, and Medical Reports, for the years 1861 *and* 1862.—*Bluebooks,* 1863 *and* 1864.

IN our numbers for October, 1861, and April, 1863, we reviewed the first two annual Reports of the Army Medical Department. The reports for the two subsequent years followed in due order, and these we now propose to briefly notice. We have formerly explained that these Bluebooks consist of three separate reports, statistical, sanitary, and medical, presented by the heads of the three branches of the Director-General's office, to their chief, the Director-General. The statistical report is written by Dr. Balfour; the sanitary by Dr. Logan; and the medical by Dr. Mapleton, assisted, in 1862, by Dr. Crawford. The sanitary and the medical sections also contain various papers and essays, contributed by the officers of the department.

The whole report forms a very complete statement of the condition of the army in all parts of the world, of the state of its health, and of sanitary progress.

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[1] Deutschrift der, in Würzburg, versammelten Bischöfe. 1848.

The statistical reports for 1861 and 1862 are by Dr. Balfour. They are drawn up in the same way as in the former reports, and are distinguished by the same completeness and accuracy. In 1861 and 1862 the amount of sickness and mortality of the army, in many stations, remained pretty much the same as in 1859 and 1860. On the whole, there is some improvement in almost all parts of the world, but in India the decline in mortality is considerable. On the Home Service the following table gives the gross results :

	Ratio per 1000 of mean strength.		
Years.	Admitted into hospital.	Died.	Constantly sick.
1860-61	1040	9·61	54·66
1862	989	8·72	53·45

The decline in deaths in 1862, as compared with 1860-61, extends over almost all the causes in a slight degree, which is doubtless a satisfactory circumstance as showing that the lessening is not attributable to any extraordinary or exceptional influence exerted on one class of diseases, but must be owing to general improvement going on everywhere.

Formerly the men on home service, and especially those who served constantly at home, showed a most remarkable liability to affections of the lungs, and especially to phthisis. We turned with interest to these Bluebooks, to see how the case stands now. In the years 1860-61 the deaths from "tubercular diseases" (chiefly phthisis) amounted to 3·41, and in 1862 to 3·67 per 1000 of strength ; so that in this class of cases there was no decrease, but even a slight increase in mortality, and this in spite of a very active invaliding, which threw out on the civil population a considerable number of phthisical patients. If the number of the persons discharged the service for tubercular diseases be added to the number of deaths, the following table is given :

Annual Decrease per 1000 *of mean strength by Death and Invaliding from Tubercular Diseases* (BALFOUR).

	1860-61.	1862.
Household Cavalry	5·32	10·64
Dragoon Guards and Dragoons	10·53	6·58
Royal Artillery	8·94	12·51
Military Train	11·8	4·85
Foot Guards	16·88	20·62
Infantry regiments	7·81	8·46
Cavalry depôts	937	7·91
Depôts of battalions	14	15·41

The loss sustained yearly is thus very considerable, and, as will be seen, differs very much in different branches of the service ; the causes of the immense loss sustained by the Foot Guards ought to be carefully examined, the more so as it is certain that it is no exceptional circumstance, but has been constant for many years. The only way to properly examine a point of this kind is for the medical officers of the Guards to inquire most closely into all the circumstances attending the attack of phthisis in every patient who enters the hospital. A single year's observations, carefully made, would probably show in which direction the causes of the production of phthisis must be looked for. The contrast between the Foot Guards and the Infantry Regiments of the Line is certainly very extraordinary.

It is not easy to say how much the loss of the army by phthisis exceeds the civil loss, on account of the invaliding of the army, which does not permit the men to die in the military hospitals. A Parliamentary return has lately been issued,[1] which gives the mortality from phthisis, at different ages, in all the registration districts of England. Between the ages of 15 and 45, the deaths from phthisis in all England were 3·7 per 1000 living, which is nearly the proportion of deaths in the army; but then the army casts out its phthisical cases, and the Foot Guards discharged, in 1860, no fewer than 15·68 per 1000 of strength; when these men die, their deaths are reckoned in the civil loss. The more the case is looked into, the more clearly does it come out against the army. The causes, then, of whatever nature, which, in the earlier years of the statistical reports, produced so much lung disease, are still acting, though in a lessened degree.

The most satisfactory feature in the statistical returns of home service is the great lessening in the prevalence and mortality of continued fevers, chiefly typhoïd; for example, in the years 1837–46, the Foot Guards had yearly 77·7 admissions, and 2·44 deaths per 1000 of strength; in the three years ending 1861 the admissions were 30, and the deaths ·63 per 1000 of strength. In the Infantry of the Line the decline was even greater.

A point of great importance is the determination of the exact effect produced on the young civilian by the system he is subjected to when he enters the army, or, in other words, of the amount of sickness and mortality during the first three or four years of service. The statistical returns of the English army do not, at present, admit of this being done, but in the French army, the report lately published gives us this information for the year 1862.[2] The mortality in the whole French army being about 9, in that year it amounted to 11·45 per 1000 of strength among the men under one year of service, and to no less than 13·38 per 1000 among the men of two and three years' service; it then declined, until between the 7th and 10th years of service (inclusive), it was only 4·99 per 1000 of strength; it then slowly rose again. The French army serving more in one country than the English, gives us a better opportunity of testing the isolated effect of army service on the young soldiers than our own army; and if one year's returns represent the usual condition of things, it seems pretty clear that the transference from the conditions of civil to those of army life has in the French army a very disastrous effect. But then it must be remembered, that in an army of conscripts the moral influences may be more depressing than in the case of volunteers.

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[1] A Return of the Average Annual Proportion of Deaths from Specified Causes, at Specified Ages, in England generally, and in Registration Districts, during the Decennial Period 1851-1860. Ordered by the House of Commons to be printed, February, 1864.

[2] Statisque Médicale de l'Armée pendant l'Année 1862. Paris, 1864, p. 11.

In the foreign service of the army, the Statistical Reports for 1861 and 1862 show almost everywhere a very gratifying reduction of sickness and mortality. In India, the mortality among the Queen's troops was as follows in the two years in the three Presidencies:

	Deaths per 1000 of strength.		
	Bengal.	Bombay.	Madras.
1861	45·57	24·72	15·83
1862	27·55	24 ·6	20·83

These numbers contrast remarkably with the old returns, when 50, 60, and even 70 men per 1000 serving died per annum. The diminution may be partly owing to earlier invaliding; but the greater part of it must be attributable to a slow improvement in sanitary conditions, a greater use of hill sanitaria, and better treatment.

With regard to invaliding, it is probable that in future years we shall see a great extension of the plan of sending home sick men by the Red Sea. If so, it is to be hoped that the Government will organize a proper fleet of transports, or floating hospitals, on both sides of the isthmus, in place of the present rude and inefficient system of hiring merchant-vessels to carry sick men. But it is singular to observe how very slowly the Indian Government is availing itself of the excellent Hill-stations, which everywhere abound. The slowness with which the advantages of these stations is developed is incredible; there is surely no government in the world which, long before this, would not have made in all the Presidencies cheap railways for the transference of their troops to the Hills. But just as for nearly one hundred years troops were sent up the Hooghly and Ganges in native boats,—and it was not till a very few years back that proper troop-boats were used—so now we see the same apathy in regard to the Hill-stations. Apparently, what has been, must be. The recommendation of the Indian Sanitary Commission, that one-third of the European force shall be on the Hills, remains apparently a dead letter—at least, we hear of no steps being taken to carry it out; and yet without it there is little hope of the health of the troops reaching an European standard.

Turning from India to the West, we looked with great interest to the statistics of Bermuda. As we write these lines, an awful epidemic of yellow fever is raging there, and has, it is said, killed no less than eight army surgeons. Apart from yellow fever, Bermuda has been for some years fairly healthy, the average mortality per 1000 being in the years 1859–1862, 11·33 per 1000 of strength. It is a common notion that yellow fever prevails there every seven years; but this is a mistake arising from the observations of the last twenty years only.

In the eighteenth century it appeared, we believe, only twice—viz., in 1780 and 1796. It was then absent till 1818 and 1819, when it again appeared with great virulence. In 1796 and in 1818, it occured first at Ireland Island,[1] a barren rock, totally without marshes. In the former year it lasted seven months at Ireland Island before reaching St. George's (the military station,) an indisputable proof that no general atmospheric condition was present, but that local causes were the reason of its great persistence. After 1819, it was absent for twenty-four years, and then another fatal outbreak occurred in 1843; it then appeared in 1847, 1853, 1856, and 1864, or at intervals of four, six, three, and eight years. In most of the epidemics the disease has been remarkably localized in one or other place, especially among the convicts or the soldiers. In most cases, also, it has been believed to have been imported; and this is the case in the present epidemic. We beg to strongly urge on the Government the necessity of having this point carefully investigated by thoroughly impartial and competent men.

There seems no doubt that the sanitary condition of the barracks at Bermuda is bad; and if it be true, as stated in the public press ('Times,' October 14th), that the officer in command during the present epidemic refused to evacuate the barracks, when requested to do so by the medical officer, we have no hesitation in saying he ought at once to be superseded. Experience has fully proved that the very first measure to be adopted when yellow fever breaks out in a barrack is at once to move out.

In the case of an outbreak of this kind, we believe that the Army Medical Department ought to issue as soon as possible a separate and supplementary report; otherwise no official account of this epidemic will be published before the latter end of 1866, after all interest in the occurrence has been lost, and when any doubtful facts which may need inquiry may no longer be able to be properly investigated.

Our space will not permit us to refer to any other stations, but we cannot quit Dr. Balfour's Statistical Reports without again expressing our sense of their great value. It is scarcely enough to say that no other army has such a complete analysis of its condition—in fact, no other army publishes any return which can at all compare with the Statistical Reports of our army. The French Report of 1862 is, however, a very valuable document, and probably it will be much improved upon in future years. The American Reports, which before the war were so complete, are, of course, at present suspended, never probably to be renewed in their old form.

Dr. Logan, the head of the Sanitary Branch in the Army Department, is the author of the Sanitary Reports for 1861 and 1862, and in addition, various papers on hygienic matters are contributed by other officers.

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[1] Statistical Report of the Sickness, Mortality, and Invaliding of the Army, 1839. Section Bermuda.

Dr. Logan's Reports consist of abstracts of the various returns sent to him by the principal medical officers of stations, with remarks by himself. Their preparation must entail great labour on him, but the labour is well spent. Formerly the Annual Reports from stations were regularly read in the office in London, and such points as seemed to require action were brought to the notice of the authorities; but such a system as this does not work well. Men in office are annoyed by continual representations, or are apathetic, and medical officers finding their representations unheeded, cease to make them. But faithfully analysed, as they now are by Dr. Logan, and published, it is impossible that the suggestions should not be attended to. As regards the sanitary condition of the Home stations, the following points are of great interest:

The Director-General submitted, in 1862,[1] the following proposals for the employment of the troops in trades, and these propositions are now being carried out:

> "1. To organize a system which should comprise such occupations as those of the tailor, shoemaker, carpenter, joiner, mason, smith, and any such of skilled character as could be systematically applied to the self-interest of the troops as regard their clothing, appointments, and the practical execution of all repairs of their barracks and hospital buildings.
>
> "2. For all in-door trades, suitable shop accommodation should be provided, and arranged upon scales of sufficient cubic space, effective ventilation, good light, and adequate warming.
>
> "3 At the in-door trades, and particularly the more sedentary, the daily hours should be limited approximately · to four for the men, and from two to three for the soldiers' children, who may be brought under instruction according to age.
>
> "4. The principal medical officer of a station should have sanitary supervision over the progressive working of the system, and make weekly inspections of the classes.
>
> "5. These institutions, for experimental purposes, should first be organized at the camps of Aldershot, Shorncliffe, and the Curragh, if convenient to the arrangements of Government.
>
> "6. All soldiers under instruction, or employment at the trades, should take their rotation of guards, so as not to entail additional night-duties on their comrades."

The third and sixth rules are especially important, but the whole are excellent.

The Report for 1863, which will be published next year, will doubtless inform us of the inauguration of this plan.

With regard to the diet of the troops on home service, no change has been made, but Dr. Logan refers (Report for 1862, p 241), again to the amount of meat, and of food generally, which is really not sufficient.

> "The insufficiency of the meat portion, ¾ of a pound is the fixed expression of opinion by the medical officers, in so far leaving the question a purely administrative one. It is represented as frequently happening, that when the messes come to be divided after cooking, a man may obtain positively only about a third of a pound, on account of bone; and when it is remembered that his

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[1] Report for 1862, p. 240.

breakfast customarily consists of a mere pint of, certainly not over-strong, coffee, with half-a-pound of bread, it must be acknowledged that the Regulation bill of fare is not an adequate one to the appetite of a growing recruit, or soldier of any age, called upon to perform the general duties of daily drill, active field-days at the camp of instruction, and to meet, under a long fast, the night-duties of garrison and regimental guard. A late evening and an early morning cup of good coffee should be a provision for all men who have to perform night-sentries.

"Wherever the services of the Commissariat Department have been given to the provision supplies, the results have been most satisfactory, substantially and pecuniarily to the soldiers,—an interest which is said to attach many of them in preference even to the monotonous life and frequent duties at the camp at Aldershot, where they possess in the highest degree the advantage in question." (p. 241.)

The insufficiency of the diet has now been pointed out in two annual Reports, and has, we infer, been also explained to the Government by the Director-General. Nothing, however, has been done, doubtless in consequence of the expense. But the expense must be met, and we are convinced the country would not grudge it. It would, in fact, be an economy; not merely by preserving health, but in another way. There is nothing that renders men more contented or discontented, than good or bad food. Men will bear almost any other hardships with equanimity, but insufficient or improper food is never an object of indifference. At present some difficulty is experienced in getting recruits, or in re-enlisting the limited-service men whose time has expired. One of the objections which men entertain is the food. Consider, for example, what sort of breakfast the soldier gets—dry bread and ill-made coffee. He compares this, not with the breakfast of the agricultural labourer, who certainly fares no better, but with that of the mechanic, who, when in good work, lives, as one of the class said to us, "like a little gentleman." Then his dinner, much as it has been improved, is still very scanty. As Dr. Logan says, all deductions made, a man may only receive one-third of a pound of meat after cooking, a quantity quite insufficient for his wants. It seems to us that an increase in the food is imperatively demanded, and those of our readers who have influence with the authorities would do great good by talking on this matter with them. By private representations of this kind they might do great service, and obtain consideration for a very important matter.

There is another point of moment. Dr. Logan alludes to the fact that service at Aldershot, distasteful as it is in many respects to the soldier, is absolutely preferred to easier stations, because the food is better. The reason of this is as follows:—The old plan of feeding the soldier was (and in part is still) to provide him with bread and meat, and expect him to buy himself the other articles of food. The soldier then paid to his mess so much a day (3½*d.*), and the sergeant of the mess went into the market and purchased what was required.

There were two objections to this: buying in small quantities from small retail dealers, the soldier always paid exorbitantly. From some inquiries we made some years back, we found that in the case of coffee alone the soldier was paying at least 20 per cent. more than need have been paid. The risk of adulteration was also greatly increased.

The other objection to the system is even more important. It is only fitted for peace. In time of war, the soldier cannot thus go into the market and get what he wants. The Commissariat must then supply him; but the Commissariat have been accustomed to supply only bread and meat, and their machinery is not adapted for a more extensive distribution. In fact, the Commissariat in war would be called on to perform much larger duties than in peace; and we all know how difficult it is in the pressure of war to organize a fresh department.

Our system is, in fact, neither one thing nor the other; it is not the best in peace, it is impracticable in war.

Lord Herbert saw this clearly, and was very desirous of commencing the plan of making the Commissariat supply everything. The change seemed too great to be suddenly carried out, and he ordered it to be tried at Aldershot. The result is seen in Dr. Logan's report. The soldier is better and more cheaply fed, simply because a gigantic firm, the Government, has superseded all the middlemen who lived on the soldier, and too often practised frauds at his expense. But why should not the system be now extended, and the whole army be fed by the Commissariat?

At some of the large stations (Aldershot and Chatham) there are now regular Commissariat slaughter-houses. The soldier should kill his own meat. We have been informed, on good authority, that the contract price for the soldiers' meat is, in one town at any rate, below the market price of the meat; and to make the contract profitable, every diseased beast that can be procured is bought for the soldier. Medical officers should see to this, and insist on inspecting the beasts before they are killed. But if the Commissariat are to supply everything for the soldier, and if they are to use the system of contracts, we would venture, indeed, to urge the necessity of a thorough investigation of the plan of contracting by the Government. The rule seems to be but too often, both in the Commissariat and Purveying Department, to take the cheapest contract. Now cheapness is a relative term: that is not cheap which is not good, and to accept contracts which are placed at a figure below the honest market price is simply giving a premium to fraud. We know, for example, a large military hospital where milk was contracted for below the market price. Never in the course of many examinations did we find milk in that hospital which was not watered; and we know for a fact that the men who applied for the contract calculated as a matter of course on some of the supply coming from the cow with the iron tail. Surely the first object of the Commissariat and Purveying Departments should be efficiency. An officer, under the present plan, is rewarded for the cheapness with which he manages matters; efficiency seems to be secondary and unimportant, compared to the saving of expense. Care in expenditure of money is a high duty, and Government officials should, of course, save their employer from even a penny's loss; but their first duty is not to save at all hazards, and to gain an undeserved reputation by showing a balance on the right side, but to see that their work is well done, and that the articles they supply are really good.

The great check on all these points must be the medical officers of the army. Their interest is simply to see that the soldier in barrack and hospital is well fed; they should study, therefore, most carefully the various means of judging of the quality of food, and should unremittingly inquire into the point. The days are happily past when a medical officer was looked on as a troublesome fellow when he did his duty in this way; it is not likely that a case we were cognisant of will be repeated—viz., that a medical officer in India was, to use the official phrase, "well wigged," and nearly lost a staff appointment, for condemning the Commissariat meat. At present he would get the "wigging" if he did not report.

We trust Dr. Logan will persevere in directing attention to this subject until the system is satisfactorily arranged. The present chiefs of the War Office, the Duke of Cambridge and Lord de Grey, are so earnest in their efforts to improve the condition of the soldier, that as soon as the matter reaches them it will be settled.

The reports from foreign stations show that the principal medical officers are everywhere active. At Gibraltar and Malta, Drs. Paynter and Hume again refer to the numerous sanitary defects of these important fortresses; and there can be little doubt that the attention of Government must be strongly directed to this matter. We shall soon hear that the recommendations, in the very exhaustive Report on the Mediterranean Stations, by Dr. Sutherland and Captain Galton, will be acted upon. At Malta, the great prevalence of ophthalmia is still a very serious matter; but Dr. Hume is grappling vigorously with the evil. The police regulations at Malta reduced the venereal admissions to 309 in 1862, whereas in 1861 they were 651.

In Canada, Dr. Muir, Inspector-General, has suggested various important sanitary measures; gymnasia, soldiers' institutes, improved lighting of barracks, improved cooking, and better accommodation for married people.

In Jamaica, Deputy-Inspector O'Flaherty has paid special attention to the large amount of mortality among the black troops, especially from phthisis, and points out various causes connected with the service and training of the black troops which may be active in this way. Various suggestions for the white troops, and statements of the result of former improvements, are also made.

At all the other stations equally good reports have been sent home, proving most satisfactorily not only that the sanitary regulations are working very well, but that the principal medical officers of the army are worthy of their high position.

One change in foreign service has been lately made, by the advice of the present Director-General, which appears to be of great importance. The period of service in Ceylon and the Mauritius is now shortened to five years, the remainder of the foreign service being passed at the Cape of Good Hope.

In addition to Dr. Logan's abstracts, various sanitary papers are contributed by officers of the department.

In the Report of 1861, are papers by Dr. Crawford, on the Districts of the Bengal Command; by Dr. Hanbury, on Typhoïd Fever in India; by Dr. Inglis, on Kurrachee; by Dr. Monro, on Subathoo; by Dr. Scott, on Mean Meer; by Mr. Matthew, on the Sanitarium at Citta Vecchia, in Malta; by the Professors of the Army Medical School, on Carniset; and by Messrs. Hewlett, St. John Stanley, and Baynes Reed, on the Ventilation of the Barracks at Gravesend. There is not one of these Papers which is not full of interest: the short Report on the Ventilation of the Barracks at Gravesend is particularly well done.

In the Report for 1862, papers are given by Drs. Massy and Stewart, on Certain Indian Hill-Stations; by Dr. de Chaumont, on the Value of Taste in judging of Drinking Water; by Dr. Monro, on the Medical History of the 93rd Highlanders; by Dr. Muir, on Canada; by Dr. McIlree, on Nova Scotia; and by Mr. Rowe, on Lagos.

These also are all admirable Papers, full of instruction and interest. Dr. Muir's Report of Canada is a model of what such Papers should be; and Dr. Monro's account of the 93rd Highlanders is a very important contribution to the history of a noble corps.

Dr. de Chaumont's essay is very short, occupying only two pages, but it deals with a question which has been strangely neglected. Of what value is taste in judging of the purity of drinking water? When, some time ago, we had occasion to put this question to ourselves, we could find in sanitary works no sufficient, or indeed, any answer. In reality, taste is a very bad guide; a quotation from Dr. de Chaumont's Paper will be both instructive and amusing. Water containing different quantities of chloride of sodium was tasted by different persons, who did not of course know what the water contained.

Water with 105 grains of chloride of sodium per gallon was distinguished by all as brackish.

With 70 grains per gallon, there were the following opinions:

1. Faintly brackish; 2. Faint taste of soda; 3. Distilled water; 4. Slight taste of wood; 5. Distilled water; 6. Insipid—thought distilled water tasted metallic; 7. Distilled water.

With 43 grains in the gallon; 5 glasses with the same water were placed before different persons.

First person: All 5 distilled water.

Second person: All 5 distilled water.

Third person: Nos. 1 and 4 brackish; the rest distilled.

Fourth person: No. 1. Soft; 2. Bad—brackish; 3. Rain-water; 4. Harder than No. 2; 5. Organic matter.

Fifth person: No. 1. No taste; 2. Sweetish; 3. Nothing particular; 4 and 5. Same as No. 2.

Sixth person: No. 1. Good; 2. Boiled; 3. Not a good taste; 4. Horrible; 5. Very bad.

Seventh person: No. 1. Salt; 2. Distilled; 3. Rain-water; 4. Distilled; 5. No particular taste.

Eighth person; No. 1. Contains iron; 2. Like dilute Harrogate water; 3. Flat; 4. Peculiar and flat; 5. Saltish.

Ninth person: No. 1. Insipid; 2. Slightly brackish; 3. Same; 4. Bitter; 5. Slightly pungent.

Tenth person: All 5 sweetish.

It appears, indeed, that 70 grains per gallon of chloride of sodium are indistinguishable by most persons.

It would seem, from Dr. de Chaumont's curious experiments (which are well worthy of being carried farther), that salts of potassium are much more readily detected than salts of sodium; but there are exceptions—100 grains of bromide of potassium are not perceptible. Iron is the only substance which can be detected by taste, in quantities so small as to be barely indicated by ordinary chemical re-agents: 0·2 grains of metallic iron (= ·543 of sulphate) are at once detected by taste.

In both years Dr. Parkes contributes a Report on such hygienic points as appear to be of importance to army officers.[1] In the Report for 1862, an abstract is given of Kraus' work on the Austrian tent military hospitals, which we can recommend to our readers as bearing very strongly on the treatment of disease.

The Medical Reports for 1861 and 1862, by Drs. Mapleton and Crawford, contain the record of the movements of the officers of the department, all the orders and circulars published in the year, and various medical and surgical papers.

Among the latter are some very important contributions to medical science. A paper by Dr. Marston, R.A., on the Fever of Malta (Report for 1861, p. 486,) gives a very thorough analysis of Malta fever, and our space alone prevents us from abstracting many parts of this. We recommend it, however, to all our readers. Dr. Marston is clear that neither true exanthematic typhus nor the "relapsing fever" prevail in Malta; the fevers are typhoïd, the so-called "Mediterranean," or gastric remittent fever, and "bilious fever." The "gastric remittent" is carefully described, and is contrasted with relapsing fever. The line is not well drawn between "gastric remittent" and "bilious fevers." The term "gastric remittent" is not so good as "Mediterranean," as it has been applied to other diseases, and even to typhoïd. We feel quite certain that the exact diagnosis of these fevers will not be made out until there are numerous observations on the temperature of the body, so as to permit a typical curve of temperature to be drawn. As far as symptoms and post-mortem appearances are concerned, Dr. Marston has given us a very complete account.

Professor Longmore, of the Army Medical School, contributes a paper to each Report, on the Gunshot and Sabre Wounds in Patients sent to Netley. Both are very important surgical documents, and give us an excellent idea of the changes going on in military surgery.

A very interesting paper is communicated in the Report for 1862 by Professor Maclean, On some of the Forms of Disease among Tropical Invalids. Incidentally, also, reference is made to the causes of diseases on Home stations. We must content ourselves with two short remarks on this able paper. In speaking of phthisis, Dr. Maclean tells us that out of 1102 cases of phthisis admitted in two years at Fort Pitt, no less than 195 came from India; and he adds, that "the causes tending to develope this disease among soldiers are quite as rife in Indian barracks as at home." And these causes are overcrowding, and vitiated barrack air. The idea so deeply imprinted in the medical mind, that phthisis is a disease only of cold and bleak climates, will at length, we hope, be rooted out.

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[1] We hope shortly to present to our readers a review of Dr. Parkes' recent work on Practical Hygiene.

Under the head of Chronic Hepatitis, Dr. Maclean tells us that several diseases are included—viz., livers enlarged from the effects of malaria; waxy or lardaceous livers, such as are found in the syphilitic dyscrasia; and true chronic hepatitis, in which the gland has become enlarged from congestion and inflammation of the parenchyma, with deposition of lymph in the areolar structure round the portal vessels. It seems very necessary for army medical officers to distinguish between these several diseases, otherwise the means of prevention of tropical chronic liver disease can never be determined.

In reference to syphilitic disease, Dr. Maclean writes:

> "I cannot pass this subject without recording my conviction that the time has come when the authorities must face this question. I offer no opinion on the best mode of dealing with it at home, and admit that the difficulties—religious, moral, and political—in the way are neither few nor trifling. In India no such difficulties need be feared. I unhesitatingly say that good police-magistrates, with the active co-operation of the chief military and medical officers in the various stations, would in a few years extinguish this plague. If any one is anxious to study the extent to which this disease prevails in the army, and the mischief it works, I recommend a careful inspection of the post-mortem records of Fort Pitt and Netley Hospitals, as kept by my colleague, Professor Aitken. They would there see a terrible confirmation of the saying, that 'The wages of sin is death.'"

He afterwards refers to the pathological museum at Netley, which "is rich in syphilitic livers."

We strongly recommend these valuable Reports of Dr. Maclean to the attention of the authorities; they are full of useful suggestions for the prevention of disease.

Dr. Crawford contributes to the Report of 1862 a very valuable Report on Recruiting, and on the Disabilities which prevent Entrance into the Service.

There are many shorter reports on different subjects, which we can only enumerate.

In the Report of 1861.

On the Influence of Pandemic Causes in the production of Fevers, by Robert Lawson, Deputy Inspector-General.

On Pulmonary Diseases, and their Relation to Syphilis, by Dr. David Milroy, 30th Regiment.

Notice of Pulmonary Lesions associated with Syphilis, by Professor Aitken.[1]

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[1] A notice of this communication will be found in an article on Syphilis in the present number of the Review, see p. 42.

Annual Report of the Lunatic Hospital, Fort Pitt, by Mr. Barron.
Case of extensive Abscess in both Kidneys, by Dr. Rutherford, Deputy Inspector-General.
Transfixion of the Abdomen by a Bayonet, by Dr. Todd.
Excision of the Knee-joint, by Dr. Fox.
Case of Ununited Fracture, by Dr. Fogo.

In the Report of 1862.

On the Treatment of Internal Aneurysms, by Dr. Tufnell.
On the Direct Volumetric Determination of Uric Acid in the Urine, by Dr. de Chaumont (in which a very good process is given).
Various Cases, by Messrs. Lewer; Manifold; McFall; Munro; Drysdale; Crosse; Blake; Munday; Thursfield; and McGill, follow.

There are therefore many Papers of note in these two volumes, and we could wish that their merits were more thoroughly appreciated by the profession at large. The Reports ought to be in all large libraries, as they not only chronicle the health of the army, but contain important additions to medical science at large.

In conclusion, we feel we are quite justified in repeating the favourable judgment we expressed on the publication of the first two Annual Reports. From year to year, indeed, the reports are becoming more complete and more accurate, and are worthy of a department which just now lies, from causes it cannot itself remedy, under a shade; but which at the present moment, as at all times, has numbered in its ranks men of the greatest scientific acumen and knowledge.

REVIEW VI.

1. *Theoria Generationis.* Quam pro gradu doctor med. stabilivit, publice eam defensurus d. 28 Novemb. 1759. h. l. q. s. CASP. FRIDER. WOLFF, Berolinensis. Cum II. tabb. aen. Hal. ad Sal.
2. *On the Wolffian Bodies of the Fœtus and their Remains in the Adult: including the Development of the Generative System.* Prize Thesis. By WILLIAM MITCHELL BANKS, M.D.—*Edinburgh*, 1864.

ON the 28th day of November, 1759, Caspar Friedrich Wolff publicly defended a thesis on the occasion of his graduation in medicine, in which he advanced a new theory of generation, and described various new structures and arrangements of parts. His thesis was published in Latin, at Halle, in 1759 and 1774, and in German,[1] at Berlin, in 1764. Amongst other novelties, he pointed out the presence in the chick, on the 3rd, 4th, and 5th days of incubation, of a substantia cellulosa on the anterior aspect of the lumbar portion of the spine, which he considered to be the rudiment of the kidneys, and which subsequently divided into two oval bodies, and acquired the shape of those organs. These bodies have been named after their discover, Corpora Wolffiana; they have been shown to exist in mammals, birds, reptiles, and amphibia, and upon them the attention of embryologists has been centred for many years in connexion with the development of certain parts of the generative apparatus. It may not be uninteresting briefly to trace the leading opinions which embryologists have entertained respecting their nature, office, and final transformation. The works the titles of which we have placed at the head of this article, representing somewhat more than a century of research, are the earliest and latest contributions to their anatomy.

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[1] Theorie von der Generation, in zwei Abhandl. erklärt und bewiesen. Von Casp. Friedr. Wolff. Berlin, 1764.

As has just been stated, Wolff looked upon these bodies as the rudimentary kidneys, an opinion which their form and position appeared to render probable, but later and more careful observations have shown that they do not stand in any genetic relation to the permanent kidneys, for these organs are developed behind the Wolffian bodies, and quite independent of them, and, as the late investigations would seem to prove, they arise as hollow outshoots from the posterior wall of the urinary bladder.[1] But though not possessing any genetic connexion with the permanent kidneys, yet in structure, as Rathke has pointed out, they are not unlike those organs, for they contain Malpighian corpuscles; and, from the fact of uric acid having been detected by Jacobson in the fluid of the allantois before the permanent kidneys were developed, it is probable that urine is secreted by them in the embryo, and discharged along their excretory ducts into the sac of the allantois. Hence the name of primordial kidneys, (Urniere) given to these bodies by Rathke is not inappropriate.

Embryologists next observed that the genital gland (testicle in the male, ovary in the female) was developed as a thin white streak along the inner border of the Wolffian body, and from the close relation of the one to the other, it was thought that the genital gland might be, in some measure, derived from the Wolffian body. But in this, as in the case of the kidney, no genetic connexion has been traced. The difference of structure between the Wolffian bodies and the testis or ovary would indeed of itself indicate their organic independence. Thus it may now be accepted as a well-established fact in embryology that neither the kidneys nor the genital glands take their rise from the Wolffian bodies.

Are these organs then merely rudimentary—subserving no purpose in the perfected economy? or are any structures in the fully developed animal to be regarded as their descendants? In truth they almost entirely disappear, and their atrophy is in a measure commensurate with the development of the surrounding parts. The question which has of late most engaged the attention of embryologists has been to determine to how great an extent this atrophy takes place. To enter properly into this inquiry it will be necessary not only that the changes in the Wolffian bodies themselves should be considered, but that the final transformation of their excretory ducts should be included in the investigation; and along with these latter, the very remarkable tube-like structures, first described by Johannes Müller, which extend along the outer borders of the Wolffian bodies in close relation to the excretory ducts, and which open along with them into the allantois, must be attended to. These tubes, named after their discoverer, the Müllerian ducts, are at first solid filaments, but in process of time become hollow ducts.

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[1] Kölliker: Entwickelung-geschichte, p. 433.

The transformation of these different parts necessarily differs in the two sexes. Various embryologists have stated that in the male the Wolffian body bore some definite relation to the epididymis. Meckel, for example, compared it to that structure. Rathke believed that it became the epididymis. In an elaborate thesis,[1] published in 1847, Kobelt minutely described the changes which he supposed these bodies underwent. He believed the upper set of tubules of which they are composed to be converted into small cysts, situated on, or in, the epididymis; the middle set to become the coni vasculosi or globus major of the epididymis, and the lower set of tubules, the vas aberrans of Haller. Many subsequent inquirers have accepted these statements of Kobelt, and they are incorporated in various articles on the subject. Johannes Müller, however, believed that the Wolffian bodies entirely disappeared in both sexes, and were not converted into any other organ. Dr. Cleland also, in an Inaugural Thesis,[2] contended that the convoluted mass situated at the upper end of the testicle, which forms the globus major, is not composed of the transformed tubules of the Wolffian body, but arises independently of it; "for were this the case, we should find them consisting of hollow tubules from the first, whereas they begin as solid bands indistinctly separated and smaller than the Wolffian tubules." The same view is yet more strongly insisted on by Dr. Banks in the thesis cited at the head of this article. He states that, as the upper end of the Wolffian body atrophies a new structure appears, which is situated near the summit of the testis, much as the supra-renal capsule is on the kidney.

> "This new structure is composed of a homogeneous substance containing tubules about twelve to eighteen in number, as far as I could count, which run almost transversely from without inwards, being broad at their outer ends and pointed at their inner, where they converge somewhat towards each other. They are slightly wavy in their course; at their outer ends they are seen to be bound together by a tube running round, into which they would seem to open; and I am convinced that the Wolffian duct, becoming slightly prolonged upwards, effects a junction with this common tube. Here then are the coni vasculosi of the adult."

Dr. Banks illustrates his view by drawings of various of his preparations, which seem to us to bear out the accuracy of his conclusion, that the caput epididymis is developed from a new structure, altogether independent of the Wolffian body.

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[1] Der Neben-Eierstock des Weibes. Heidelberg, 1847.

[2] The Mechanism of the Gubernaculum Testis. Edinburgh, 1856. We gave a short notice of the principal subject-matter of this thesis in our April number, 1857.

In the female, the Wolffian body has never been looked upon as undergoing any important transformation. Both Rathke and Müller considered that it completely atrophied. Kobelt, however, looked upon it as not entirely disappearing, but as forming on each side a body, termed by him the parovarium, but which had previously been described and named after its original discoverer, the organ of Rosenmüller. This structure is situated in the duplicature of peritoneum, between the ovary and Fallopian tube, and it was regarded by Kobelt as the homologue of the caput epididymis, and like it, derived from the middle set of tubules of the Wolffian body. In the course of his inquiries, Dr. Banks has seen reason to doubt this conclusion of Kobelt's; and he believes that the parovarium, like the caput epididymis, is developed from the new structure formed at the upper end of the Wolffian body, and not from the tubules of that body. Dr. Banks therefore agrees with Johannes Müller, in stating that the Wolffian bodies do not enter into the construction of the genital system, and further, that the only remains of them in the adult are the organs of Giraldès, and vasa aberrantia of Haller in the male spermatic cord, and some small fragmentary tubules and granules scattered about in the neighbourhood of the parovarium in the female.

We will, in the next place, say a few words respecting the final transformation of the duct of Müller, and the excretory duct of the Wolffian body. Müller himself believed that the duct bearing his name was developed in the male into the vas deferens, and in the female into the Fallopian tube, and for this reason he called it the efferent duct of the generative apparatus. Further, he held that the excretory duct atrophied along with the Wolffian body; and these opinions have been also entertained by Bischoff, Coste, Follin, and Cleland. Rathke, however, contended that whilst in the female the Fallopian tube was formed from the Müllerian duct, the excretory duct disappearing, yet that in the male the latter was developed into the vas deferens. Kobelt also concluded that the excretory duct formed the vas deferens, the globus minor, and body of the epididymis, and that the Müllerian duct became the Fallopian tube; so that the sexual difference was due to the development of one of these ducts in the one sex, and to its arrest in the other. This conception of the metamorphosis is the one now generally accepted by embryologists, and though Dr. Banks was at first inclined to adopt the view of Müller—

> "Yet, on reconsidering the matter on a new series of embryos, I was eventually convinced that the opinion I had espoused was wrong, and that that of Rathke, Kobelt, and Kölliker was the only one which could at once satisfactorily account for the eccentricities of hermaphrodism, and give a natural explanation of the origin and anatomical significance of such bodies as the hydatid of Morgagni, the vas aberrans of Haller, and the organ of Weber."

We will not at the present time occupy more space in elucidating the latest views of the mode of development of the bodies mentioned at the conclusion of the last paragraph. It may suffice, perhaps, if we extract a table which Dr. Banks has drawn up of the embryonic structures which enter into the formation of the generative system and the homologous parts in the male and in the female.

THE WOLFFIAN BODY ITSELF.

In the Female.	*In the Male.*
Fragmentary tubes and canalicules disposed in neighbourhood of parovarium.	Organ of Giraldés and some of the tubules adhering to excretory duct forming the vasa aberrantia.

NEW STRUCTURE ON SUMMIT.

Parovarium.	Globus major.

MÜLLER'S DUCTS.

Ampulla forms the fimbriated end of the Fallopian tube.	Ampulla forms the hydatid of Morgagni.
From ampulla to round ligament forms the Fallopian tube itself.	From ampulla to gubernaculum forms small cysts, running from the hydatid of Morgagni down side of the epididymis.
From round ligament to genital cord forms the cornua uteri.	From gubernaculum to genital cord forms cornua of the organ of Weber.
When united in genital cord, they form the uterus and vagina.	When united in genital cord, they form organ of Weber.

EXCRETORY DUCTS.

Gaertner's canals.	Vas deferens, body and globus minor of epididymis.
Diverticula in them.	Broad and sacculated ends of the vasa deferentia.

EXTERNAL ORGANS.

In the Female.	*In the Male.*
Clitoris.	Penis.
Pars intermedia.	Corpus spongiosum.
Labia majora.	Scrotum.
Bulbus vestibuli.	Bulb.
Labia minora.	Cutaneous covering of the urethra.

SINUS UROGENITALIS.

Vestibulum vaginæ.	Membranous part of the urethra, and a small part of the prostatic.

The embryonic structures, the changes taking place in which we have considered in this article, are interesting, not only in connexion with the part they play in the development of organs fulfilling important functions in adult life, but because it sometimes happens that, through some irregularity in the method of their metamorphosis, structures are produced which are regarded as pathological. We do not here refer to those remarkable cases in which in the same individual organs proper to both sexes are met with, and of which so exhaustive an account has been given by Professor Simpson in his article on

Hermaphroditism,[1] but to the formation of cysts in connexion with one or other of the generative organs. In the female, these occur in the neighbourhood of the ovary and Fallopian tube; in the male, in connexion with the spermatic cord and testis. The morphology of these cysts has, of late years, formed the subject of considerable discussion amongst pathologists; and much light has been thrown upon their nature by the labours of Curling, Paget, Luschka, Gosselin, and Giraldès.

Dr. Banks has devoted the concluding pages of his thesis to the consideration of these structures. He holds that the majority of those curious cysts, termed seminal cysts by Mr. Paget, containing spermatozoa, are found on the caput epididymis, and are probably formed from dilatations of the tubules of that body; whilst those met with somewhat higher up on the spermatic cord possibly result from the dilated ends of the vasa aberrantia. He fully admits that the organ of Giraldès may also give rise to cysts on the spermatic cord, but these never contain spermatozoa. For as the corps innominé of Giraldès is merely the remains of the Wolffian body, and as that body has no resemblance in its structure to the testicle, it is scarcely to be supposed that so elaborate a secretion as the semen could be formed within its dilated tubules.

The hydatid of Morgagni, or closed end of Müller's duct in the male, very rarely becomes the seat of cystic dilatation; though M. Gosselin has seen it enlarged in several cases in old people. The delicate pedicle which attaches it either to the globus major or to the angle between that body and the testis, may be broken, and then the hydatid may fall into the sac of the tunica vaginalis, and become a source of irritation. Dr. Banks is inclined to ascribe the loose cartilaginous-like bodies occasionally found in the sac of the tunica vaginalis to this circumstance.

We cannot close this notice of the most recent investigations into the anatomy of the Wolffian bodies without expressing the high opinion we entertain not only of the extent of minute and careful observation, but of the critical acumen which Dr. Banks has displayed in the thesis from which we have so frequently quoted. It contains by far the best description of these structures to be found in the English language; and it will, we believe, take a high position amongst those prize theses which the system of education and examination pursued in the University of Edinburgh encourages its alumni to produce.

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[1] Obstetric Memoirs, vol. ii.

REVIEW VII.

1. *Transactions of the Ethnological Society of London.* Vol. I., New Series.—*London*, 1861. pp. 378.
2. *Anniversary Address, delivered before the Anthropological Society of London, January 5th*, 1864. By JAMES HUNT, Ph.D., &c., President.—*London*, 1864. pp. 24.

NEVER was there a time, we believe, when the history of man, in all its details, excited so much interest, and gave rise to so much research, as at present. The existence of two societies in London, both of recent origin, differing, as regards their objects, little but in name, can hardly be accounted for otherwise. This is not a place to consider the propriety of having two societies with aims so similar as to be almost identical, when it may be presumed by many that one would suffice. One advantage, at least, we would hope will result from the duality—viz., energy and zeal of competition. And when we reflect on the subject-matter of both in all its complexity and its entireness, we cannot hesitate in thinking that there will be ample scope, and for a long period to come, for the exertions of the members of both these societies, however active they may be.

Dr. James Hunt, in his able address, lays great emphasis on the vastness and variety of studies required for the prosecution of the inquiry, and very properly puts aside mere authority, remarking, "We shall do well to remember that in science we cannot recognise authority; for science must be founded on facts, and not on authorities, however great and venerable." This, of course, we must assent to; but we can hardly assent to what follows, when he adds: "It is only recently that we in England have already recognised this principle; and in this we are far behind our scientific brethren in France or Germany." He surely forgets the motto of our Royal Society, and how the excellent sentiment it expresses has long been acted on by the many illustrious men we can boast of, the lights of science, and some of the greatest of discoverers. In fact, without the principle he insists on, there could hardly be any thorough and fresh inquiry in any branch of science.

The volume of the Ethnological Society now before us, we can honestly say, after reading its contents, is an auspicious beginning of the new series. It contains an ample number of papers, as many as twenty-eight. These in their character are very various: some are little more than amusing; others are highly instructing; but none of them, as we apprehend, will be generally received as carrying conviction to the minds of their readers, as regards the main points which their authors endeavour to establish. Nor is this surprising, considering the nature of those points or problems which are discussed, such as the different questions which have been propounded concerning man, and first and chief of all, that of unity, or of plurality, of species and origin.

The variety of opinion expressed in these papers on this problem is widely marked, and at least shows how difficult is its nature, and also, we fear we must add, that the time is not yet arrived to allow of its satisfactory solution, owing to want of well-authenticated facts, and in sufficient number. An eloquent writer has well said:

> "Il faut bien l'avouer, nous ne nous connaissons pas encore nous-mêmes: si nous nous tournons vers le passé, nous pouvons à peine remonter le courant de quelques siècles; l'homme primitif nous échappe: quelques grossiers débris de silex, des traditions bizarres et confuses, voilà tout ce qui nous en reste."

The writers most opposed to each other are Mr. Dunn and Mr. Crawford—the one advocating unity of race, the other diversity of origin. Mr. Dunn supports his views in two papers, with the following titles: "Some Observations on the Tegumentary Differences which exist among the Races of Man;" and "On the Physiological and Psychological Evidence in support of the Unity of the Human Species." Mr. Crawford takes a wide range; he has contributed four papers, in which he either incidentally or directly maintains the hypothesis which he favours. His first is, "On the Effects of Commixture, Locality, Climate, and Food, on the Races of Man;" his second, "On the Conditions which Favour, Retard, or Obstruct the Early Civilization of Man;" his third, "On the Aryan and Indo-Germanic Theory;" and his fourth is "On the Classification of the Races of Man."

It is pretty generally allowed, equally, we believe, by Monogonists and Polygamists, that man, wherever found, whether within the polar circle or the tropics, whether civilized to the highest degree yet reached, or in the lowest stage of civilization, is organically similarly constructed, is capable of interbreeding,[1] has like passions and propensities, and from birth to life's terminus runs a like course, observes the same stages, his time of puberty the same, of maturity the same, and the average duration of life much the same, when not cut short by diseases, and these common to all.[2]

Whilst these points of resemblance are admitted, others are insisted on denoting differences, such as the form of cranium, the quality of hair, the colour of the skin, &c.—differences held by some to point to difference of species; by others to be valueless as distinctive characteristics of race.

Mr. Dunn is the representative of those who hold the latter opinion. In a former paper—one published in the fourth volume of the 'Journal of the Ethnological Society'—he has endeavoured to prove, and we think with some success, that little stress can be laid on diversity of cranial form as regards difference of race, his argument being that typical forms are convertible, "under the varying influence of outward circumstances of civilized states." We would rather insist that these forms are more or less mixed in every people with whom we are well acquainted, and in no people is one type unexceptionally met with. Who that has examined a large collection of crania, containing specimens of those of the Caffre and Hottentot, of the Australian and Tasmanian, has not found individual examples which bear, at least in the well-developed frontal bone and the general shape of the calvaria, a close resemblance to the best specimens of the Caucasian cranium? The experience of our farmers should, we think, teach us to place little reliance on mere form. They know by experience hôw, by selection and cross-breeding, the shape of the head and its appendages can be varied. In the human race, we have an instance in the Turks of great change of the general form of features by the like process, with the addition, perhaps, of influence of climate and diet.[1] In no feature does the existing race resemble that of the Mongolian stock from whence it was derived; and the same remark is applicable to the Hungarian Magyar. The facial bones, the maxillary, molar, nasal, are, we are inclined to consider, more distinctive than the cranial. The prognathic form is rarely met with, except in the wildest and rudest races; whilst the orthognathic is seen to predominate in various races, widely apart, who have made some progress in civilization.

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[1] It has been asserted that the Australians and Tasmanians are an exception, and that even the circumstance of their women cohabiting with Europeans has resulted in rendering them barren, in case of after-marriage with men of their own race. Both these assertions—the latter of which has given rise to strange hypotheses—have, we think, been amply disproved.

[2] The African negro, it has been said, differs from the European in being exempt from yellow fever and ague—a statement true to a certain extent; the acclimatized are, in a great measure, exempt; but, if otherwise, if they come from a cool region to a hot, as from Canada to Demerara, or other places, when infected, within the tropics, they are not secure from attack.

Should these remarks be objected to, as too vague and general, we would refer to the recent observations of two distinguished physiologists, Retzius and Rudolf Wagner—the one on the form of crania of different races, the other on the weight of the brain; the one giving examples of similarity of shape of head of peoples most widely apart, and by some supposed to be distinct species, such as the African negro and the majority of Europeans, both of the dolicocephalous type; the other showing that it is an error as maintained by many, that men of superior intelligence have proportionally large brains, or exceeding the average weight.[2]

As regards different qualities of hair, these are observable chiefly in its colour and its condition, as to being straight or curling, growing regularly from the surface of the head without apparent intervals, or in crisp tufts more or less apart. Now, whether it be of the latter description, as in the instance of the Boshman and Hottentot, or of the former, as in the European, the Asiatic, and American, in structure it is now admitted to be nearly identical, so much so that even when most resembling wool in its aspects, it is found, microscopically viewed, to be altogether different from true wool, the wool of the sheep. Moreover, it is not denied that there is a gradation from one variety of hair into another. As to the hair's colour, that, as well as the colour of the eyes and complexion, is seen to vary greatly amongst the same people. On this point Mr. Dunn quotes Dr. John Davy, relative to the Cingalese: they, Dr. Davy states, "vary in colour from light brown to black; the prevalent hue of their hair and eyes is black, but hazel eyes and brown hair are not uncommon; grey eyes and red hair are occasionally seen, though rarely, and sometimes the light blue or red eye and the light flaxen hair of the Albino." That there is commonly a certain accordance between the colour of the hair and eyes and the colour of the skin is well known, even to the casual observer, and is proved statistically by Dr. Beddoe, in two papers published in this volume, one "On the physical character of the natives of some parts of Italy and of the Austrian dominions, &c.," the other "On the physical characteristics of the Jews;" to which we would refer those of our readers who are curious in this matter, and can attach any importance to such varieties. We need hardly remark that the darker hues of both depend on the presence of a dark colouring matter, which in the skin is situated in what was once called the rete mucosum, and is now held by anatomists to be the innermost layer of the epidermis—a colouring matter, which in the Albino and the very fair is absent, but why remains to be ascertained. The fact that the skin of the Albino and of the fair is not darkened by exposure to the sun's rays, whilst that of the *brunet* is, would seem to indicate that the inner layer of the cuticle in the latter has a property distinct from that of the same layer in the former, viz., of secreting colouring matter from the blood. As a general rule, it may be said to be admitted that the colour of the skin, of the hair, and of the eyes, bears some relation to the temperature of the climate, increasing in intensity mostly with increase of solar heat, and *vice-versa*. We have well-marked examples of it in Europeans, comparing the people of the north with those of the south, the Norwegians and Swedes with the Italians, Spaniards, and Portuguese: we have also examples of it in Asia and Africa, though hardly so well marked and so finely graduated; in the one, in the northern races of India compared with the southern; in the other, the natives of the cooler south, as the Boshman and Hottentot compared with those of the intertropical regions, such as the negro of the Gold-coast, and of the various tribes inhabiting that strange and marvellous continent. Adverting to final causes, we would say that this relation between the colour and atmospheric temperature is a happy provision of nature. Thus, the darker the complexion is, the less it is subject to sun-burn, the less the skin is liable to inflammation from the action of the sun's rays; and yet the greater is the exposure to these rays, the more is the dark hue intensified; whilst, on the contrary, in the instances of the fair and the Albino, the same exposure produces an inflammatory action, but without a darkening, rather a reddening of the skin followed by desquamation. These effects of the sun's rays have been well ascertained, though we think not sufficiently insisted on. Any one may satisfy himself of their correctness, by exposing the back of the hand on a summer's day to the sun—a portion blackened with Indian ink, a portion left uncoloured. During the time of exposure, the former will feel hottest, but afterwards it will feel cool, as if it had not been at all so exposed; whilst the other portion will feel unpleasantly hot, and will be more or less inflamed, according to the length of the exposure. Mr. Crawford, and those who advocate the same doctrine, lay great stress on exceptions, pointing out numerous instances of fair races in countries of high temperature, and of dark races in regions of opposite temperature; some of them well authenticated, others open to question. Of the well authenticated are the Parsees, a comparatively fair race, who since their emigration from Persia to India, centuries ago, have kept distinct, and though inhabiting some of the hottest parts of the Peninsula, as regards average yearly temperature, have not materially darkened in complexion. Of the examples adduced open to question, the Esquimaux is one. Mr. Crawford states, that though dwelling in a rigorous climate, they have the complexion of the Malays, whose abode is on the very equator. Now, we learn from Sir John Richardson (he writing from his own knowledge of these people), that their complexions, "when relieved from smoke and dirt, are nearly white, and show little of the copper-colour of the Red Indians."[1] Whilst we think it tolerably proved that there is commonly an intimate connection between the temperature and the colour, we are also of opinion that it is as well proved that hereditary colour may for ages more or less resist the influence of temperature: hence, we see in the West Indies, the "red legs" of Barbadoes, the descendants of the original colonists still retaining a fair complexion; and in our own country, for instance, in the Highlands of Scotland, where clanship is most observed, distinctions marked by colour are common; you hear of the dark Gordons; you rarely meet with a Fraser that is not fair: in Sicily, the blue-eyed Norman is not unfrequently to be met with, the descendants of that once dominant people. Further, as to colour, allowances should be made for the modes of life, and especially for amount of exposure to the sun's rays. The Parsee, in India, almost invariably leads an in-door life, immersed in trade, seldom taking exercise, except in the early morning and the late evening; so, it is the less remarkable that he escapes the darkening effects of the sun's rays, acting as radiant heat. The high castes in India, especially the Brahmins, are equally sedentary in their habits, and they generally are less dark than the low castes, who are much exposed to the sun. A like difference is observable in Europeans who have resided in India, comparing the civilians and the military, or the officers and their wives: civilians and ladies who need not, and rarely do, expose themselves during the heat of the day, on their return to England present a strong contrast to the soldiers, who during a campaign have to endure the sun's fiercest rays. In reasoning even on the complexion of the natives of the colder regions of our globe, their habits and the peculiarities of their climate should not be lost sight of. The Esquimaux, for instance, during their long summer, and under the influence of the sun's rays in an unclouded sky, occupied almost constantly in the open air, may well have their complexions somewhat darkened. Even the intense severity of their winter climate, by "burning frore," to use a Miltonic expression, and we believe founded on fact in a certain degree, may contribute to the effect. That a high temperature, with extreme atmospheric dryness, is capable of producing a change in the colour of the skin and the quality of the hair, and even suddenly, we have proof in the recorded experience of travellers. Captain Sturt, in his very interesting narrative of an expedition into central Australia, gives the following account of the effects of a hot wind, to which his party were exposed at Cooper's Creek. After stating its destructive agency on plants and animals, and how it was nearly fatal to himself, he adds; "After this exposure my muscles became rigid, and limbs contracted; gradually also my skin blackened; I was reduced to a state of perfect prostration. Our hair, as well as the wool of the sheep, had ceased to grow, and our nails had become as brittle as glass." It is mentioned that a thermometer, graduated to 127°, burst from excessive heat, though placed in the foot of a large tree.[1] Here, we must close our remarks on colour, giving in our adhesion to the doctrine, that colour *per se* is no more in man a distinctive mark of species, than in other animals; and submitting it as our opinion, that all the differences of colour observable in the human race are referrible to climate *ab origine*, and for persistency for awhile, in spite of climate, to *hereditary impress.*

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[1] We are disposed to think that the quality of diet may have an influence, if not on the size of the cranium, at least on the thickness and weight of the bony case. In a letter before us, written by a friend in Dublin, he makes mention of a good collection in that city of high-caste Indian crania, from the rice eating-districts, which are all very small and light. If the food should contain little phosphate of lime, ought we to expect large and heavy bones?

[2] See Vols. xxi. and xxii. of our Review, and Brown-Séquard's 'Journal de la Physiol.,' tom. iv. pp. 555—558.

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[1] 'The Arctic Regions,' p. 303.

Of the minor marks of difference, such as marking of nails, the crescent-white, said to be absent in the African negro, the flat foot, the long heel, the graduated toes, the less marked development of muscles forming the calf of the leg, which have been assigned to him, and some others, such as difference of odour emanating from his skin, and a greater coolness, softness, and humidity of surface—these, granting that they exist, (we cannot admit that they are universal,) are surely too trivial to constitute difference of species. We believe, however, that of those which are most constant, the soft, moist skin is a quality the better fitting those who possess it to be the residents of a hot climate. We shall very briefly comment on some of the other attributed peculiarities.

That of the nail, so far as we have been able to judge, is simply owing to the allowing the cuticle to grow over its base; were it deserving of being ranked amongst the marks of race, we ourselves should have claim to relationship with the negro, for on looking at our finger-nails, we perceive that the semilunar white mark in most of them is completely hid; the only attention we have paid to these homologies of claws being the keeping them of due length, our state of civilization not yet having sufficiently culminated to depress the investing cuticle.

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[1] For observations on the influence of a tropical climate on the wool of the sheep, and on the qualities of hair of different races of man, see Dr. John Davy's 'Physiological Researches.' 1863.

Flatness of feet, we may remark, is observable more or less in persons of different races who walk bare-footed, and on soft and yielding ground; the lower Irish and the Highlanders, as is well known to the army medical officer, afford numerous examples of it. Amongst negroes, there are many instances of well-arched insteps; and in some tribes, we have assurance that the feet are commonly well formed The long heel, though often seen in the negro, is far from constant. Mr. Craft, himself a negro, in replying (and very ably, as we had the pleasure to hear) to the President of the Anthropological Society, at the meeting of the British Association for the Advancement of Science, held at Newcastle, stated from his own knowledge that this is not the case; that the heel of the African of Sierra Leone is as short as that of any other race, and their features, their nose, as prominent. The graduated toes, after the manner of Pan's pipe, said to be a distinctive peculiarity of the Hottentot, may well be questioned as such. As well might the ancient Greeks be entitled to be considered a distinct species from the circumstance, that in the finest examples of their statuary the great toe is always represented shorter than its proximate —a difference this, common in the foot of the Asiatic and the natives of the South of Europe, but rarely seen in the foot of northern people.

Odour of person hardly deserves a remark: each person, whether prince or peasant, African or Caucasian, may thus be distinguishable. Alexander the Great was said by his courtiers to have had emanating from him a sweet odour: every dog can trace his master through a crowd by the sense of smell. Huc, the Chinese Missionary, when he passed through that country in disguise, says he was recognised by the dogs, not by the Chinese, as a foreigner; in Constantinople, the dogs show the same acuteness in distinguishing between the newly-arrived Frank and the resident Frank and the native. Irrespectively of individual odour, that so variable, ample allowances should be made for diet and personal habits as to ablution and its neglect. We have known negroes attentive to ablution, who, as regards the quality in question, were not distinguishable from Europeans; and who is there that has not amongst the latter, owing to idiosyncrasy or neglect of ablution, or the two combined, been acquainted with individuals whose room would be preferable to their company.

Those who hold that the negro is a distinct species, sometimes go so far as to assert that there is on the part of the white a natural aversion towards him, a kind of instinctive horror of him, forgetful of innumerable facts, or making light of them, proving the contrary. Were there really such a natural aversion, it may be asked, would mulattoes form so large a proportion of the population of these countries—as the Southern American States, the Spanish, French, and our West India Colonies, in which the two races have had an opportunity to commingle? Even in the Northern States of America, in which the prejudice against the negro is most strongly displayed, there is no want of mulattoes, and there the domestic servants are mostly people of colour: even in our own country the time is not very remote that blacks were similarly employed; when it was the fashion for ladies to have a black footman to wait on them, as shown in Hogarth's celebrated paintings of scenes of high life; we even remember seeing such a footman in one of the most refined families of Scotland, that of "The Man of Feeling," (the late Rev. Henry Mackenzie's), we will not say how many years ago.

An apology, we feel, is almost due to our readers for entering into such particulars; but we have been induced to do so, remembering by whom distinctions of the kind we have been considering have been brought forward. Leaving these trivialities, we must say that we are most disposed to adopt the conclusion that, physically viewed, every people or race is best adapted to the country of which it is native; and further, that any peculiarities it may have, are such as may have been chiefly derived from the influences of local agencies, acting during a long period, and are mostly beneficial in their tendencies, at least in relation to the locality and agencies to which they are owing. The European has a hard struggle for life where the negro flourishes and multiplies, as in Western Africa; the negro languishes in the cold and cool regions, where the white man is in his greatest vigour: the European, though he endures a tropical climate, is oppressed by its heat, and his children, at a certain period of their growth, as in India, die in an undue ratio compared with those of the natives; and almost invariably the adult man, as witnessed in troops, and these of any nation, experiences a degree of mortality greater when removed to foreign countries—excepting some in the Southern hemisphere,[1] than when abiding at home. Yet so hardy is man, so great is his power of accommodating himself to outward circumstances, that, allowing time for acclimatation, with very few exceptions, he can, it would appear, become the permanent resident, and maintain his ground as a race, in any part of the globe, where noxious influences, such as those of malaria, are not too overpowering. But, though having this great capability of endurance, internal agencies never fail to act on him more or less for good or for evil: hence in one, a propitious climate and soil, the tendency in man is to improve; hence in another, less propitious, the tendency may be the reverse, and both in various degrees, as is well exemplified in the many races spread over the earth's surface at present, and also in the changes recorded in history, which have taken place in the inhabitants of the same countries, with changes of circumstances, these, for the most part, and in the most striking manner, being accompanied with alterations acting intellectually and morally. Even in our own country, and at the present time, examples are not wanting: for some striking and sad instances we would refer to the Sixth Report of the medical officer of the Privy Council for 1863.

The advocates of the doctrine of the plurality of species of man, support their view by a reference to the differences observable, moral and intellectual, in different races. These differences at first glance seem to be hardly reconcileable with the idea of unity of species. But when we consider the effects of education, the aspects of a people at different periods, their transition from a rude barbarous state to a cultivated and civilized state, and this, often in a comparatively short lapse of time, the argument loses much of its force. Mr. Crawford, in his paper "On the conditions which favour, retard, or obstruct the early civilization of man," makes some excellent observations on the subject—observations seeming to us more in support of unity than of diversity of species and origin. The first, and most important condition affecting civilization he holds to be race. The negroes of Africa he adduces as an example of a people who, owing to innate specific qualities, lowness of intellectual endowments, have, of all people, made the least progress in civilization. Granted: but are not the circumstances, the agencies to which they have been exposed, physical and moral, sufficient to account for their backwardness? As to mental capacity, have we not a large number of instances of negroes who have distinguished themselves in science and literature? These, it is said, have not been of the pure African blood; but, even if so, is it not proof that that blood has not a deteriorating influence? Those who are best acquainted with the negro and other rude races, think least unfavourably of them, especially as regards mental capacity. We once asked the opinion of a friend, on whose judgment we had great reliance—a man who had been educated in England, and from residing many years in Antigua, of which he was a native, was well competent to give an opinion—what he thought of the capacity of the emancipated slaves? His reply was, that he could observe no material difference between them and the European in this respect. In the volume before us, more than one of the contributors to it write in terms favourable to the character even of some of the races which have been placed lowest in the scale of humanity. Mr. Snow, in his paper "On the Wild Tribes of Tierra del Fuego," remarks:

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[1] New Zealand, Australia, Tasmania, the Cape of Good Hope.

> "In glancing at the natives of distant lands, I have found much to make me have confidence in their power to become whatsoever the various changes of the day may require. The Esquimaux are really an intelligent race. So, to a certain extent, are the Australians; and as to the Fuegans, it was found that Jemmy Button, and especially a girl called Fugea Basket, also brought to England by Captain Fitzroy, were quite capable of intellectual improvement."

He elsewhere remarks that, after a cruise of some months along their coasts, he came away "with the most favourable impressions of the Fuegians." And we have heard similar favourable impressions expressed respecting the Tasmanians by a gentleman, their "Protector," who knew them best, Mr. Robinson,[1]—he who nobly risked his life in

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[1] We consider ourselves fortunate in being able to append to this article a communication we have received from the gentleman above mentioned, with permission to make this use of it. The facts he states, it will be seen, are of the most conclusive kind:

"MY DEAR SIR,—I take this opportunity of acknowledging the receipt of your letter of the 30th of October, respecting Count Strzelecki's assertion—'That the aboriginal native women of New South Wales and Tasmania, after connexion with Europeans, serving them, and by a confiding kindness succeeded in bringing them to terms with the Colonial Government, after military force, with a large expenditure, had failed to subdue them. We have had the pleasure of seeing, in his collection of objects of art made by these people,

lose the power of conception on renewal of intercourse with males of their own race, retaining only that of procreating with the whites'—and requesting to be informed whether that statement is in accordance with my experience. In reply, I beg to state that twenty-one years experience and observation among the Australian aboriginal natives enables me to give to this assertion my unqualified contradiction. Few native women in the settled districts of Australia but have had intercourse, some time or other, with the white men, and yet they have had children notwithstanding by their own race. Moreover, if sterility were produced by long intercourse with white men, then those of the Tasmanian native women on Flinder's Island, who had previously cohabited with the sealers, would have afforded, I imagine, the most favourable opportunity for testing that theory. But the contrary was the case; and the having a half-caste child made no difference whatever to the aboriginal native females, for on renewal of intercourse with the males of their own race they had children also by them.

"1. Of the Tasmanian native women stolen from their tribes by the sealers, *three* had been abducted when children. They had cohabited with the sealers for a number of years, and had children by them. Subsequently, on their removal by me to Flinder's Island (of which establishment I was commandant), they had children also by their own race.

"2. Yoolwurneen was a young woman of Victoria of the Jurgowrong tribe. She was for some years in the habit of frequent prostitution to the aboriginal natives and Europeans. Being better looking than the other women she was greatly sought after, and her presence on the Lodden Station was the signal for general disturbance. In 1841, she was taken by a white man, named Adams, to live with him. They cohabited for more than two months, when his conduct becoming known, and being apprehensive of the consequences, he absconded. In 1842, this woman had a very fine half-caste child; she had just before become the wife of the finest and most intelligent young man of the tribe, who would not suffer her to prostitute herself to the whites. In 1845, she had *twin children*, both living, neither of them half-caste, but of her own race. She was exceedingly libidinous in her habits, and indulged in them whenever she could get away from the observation and control of her husband.

"3. Manalla Merneen, another young woman of Victoria, was the mother of a half-caste child, four years old, and of a black child, two years old.

"4. At the Goulburn-river Station, for the north-eastern district for the aboriginal natives of Victoria, similar facts were attested by the medical officer of that establishment.

"5. From the protector of the aboriginal natives of the South Australian province (a surgeon) I also received an answer to a circular of mine of 1847, to the same effect: 'If (he states) sterility be produced, as has been asserted, in black women, by having intercourse with white men, we should have but few children born, for I am satisfied that all the young women in the settled districts have had intercourse with white men; and having a half-caste makes no difference to the native women at all.'

"6. Years have now elapsed since Count Strzelecki's statements came first under my notice. At the instant it appeared to me so fanciful (having, as I then had, ocular demonstration before me to the contrary) that I thought it scarcely necessary to notice it. But being at that time preparing for transmission to the Secretary of State my annual report on the state and condition of the Australian aboriginal natives, I thought it desirable to do so; and I believe that the remarks I then made will be found in the 'Blue Book' for the year 1847–48.

"7. How the statements I have commented on originated I am at a loss to conceive. The Count himself could have had little, if any, knowledge at all of the Australian aboriginal races beyond what is afforded to every cursory traveller that visits the Australian colonies.

"8. I am sorry to say that he is equally at fault with regard to the diseases of the aboriginal natives, for in writing on this subject he says, at page 347: 'Chiefly remarkable amongst the other diseases of the aborigines appears the leucorrhœa, a specimens affording proof of skill and taste, and showing that only instruction and favourable circumstances were required for their advancement. In another paper in this volume, that by James Hector, M.D., and W. S. W. Vaux, M.A., "A Notice of the Indians seen by the Exploring Expedition under the command of Captain Palliser," we find testimony as strong of a favourable kind. Speaking of them generally, whilst they show how various are the characters and habits of the North-American Indians, they remark: "Though, according to our ideas, they are ignorant, they are often an intelligent, thinking, and, in some senses of the word, a polished people." Of the Stoney Indians they state: "Many of them can read and write in their own language, using the Cree syllabic characters, which are easily adapted to it; and every morning and evening all the members of their camp meet to pray and sing, as they were taught by Mr. Randall."

Amongst the arguments drawn from inferiority of intellect for there

very prevalent complaint, which rages with great severity. It is a curious circumstance, attested by various experience, that the introduction of this affliction amongst uncivilized natives appears to be contemporary with the arrival of European females. In this country it is apt to be mistaken for secondary symptoms, or a modified elephantiasis.'

"9. How leucorrhœa can be mistaken for secondary symptoms, or a modified elephantiasis, I am at a loss to conceive, and would merely remark, that neither the one nor the other disease exists among the aboriginal natives either in Victoria or in the colony of Tasmania—at least, they were unknown to the medical officers of my department.

"10. Of the European diseases introduced by the whites, and from which the aboriginal natives have most suffered, syphilis and variola may be mentioned, the latter very often assuming the confluent form.

"I have referred occasionally to the Australian aboriginal natives as blacks; I have done so merely to mark the difference of colour between the purely aboriginal native and the half-caste. The natural colour of the aboriginal native is brown, approximating to dark copper-colour; and hence I was pleased to observe that an M.P., in speaking of the aboriginal races, invariably designated them as the brown men of our colonial possessions.

"In 1832, I had the portraits of a number of Tasmanian aboriginal natives of both sexes painted from life by an eminent artist at Hobart Town, with their profiles in neutral tints. Woorady and Trugernana were modelled at the same time from life; the only instance, I believe, of these interesting people having been done in sculpture. These two natives attended me in all my wanderings in the wilds of Tasmania, the most densely wooded and mountainous country for its size in the southern hemisphere, aptly termed the Switzerland of the South. On several occasions Woorady saved my life; and on the west coast of Tasmania, Trugernana swam the Arthur river, and towed me across (as I could not swim) on two pieces of wood, when closely pursued by a hostile tribe of natives.

"I would mention that, during the twenty-one years of my intercourse with the wild tribes, I never at any time carried fire-arms.

"I beg to send a specimen of writing of a Tasmanian aboriginal, son of the chief Woorady, as a souvenir of a race now all but extinct, for your acceptance;[1] and in conclusion would remark, that the facts I have stated were recorded in writing years before Count Strzelecki's book first made its appearance, and are none of them given from memory. I remain, my dear Sir, faithfully and sincerely,

"GEORGE AUGUSTUS ROBINSON, F.E.S.L.

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[1] The writing and spelling, we may remark, would be considered creditable to any youth of our national schools.

being different species of man, much stress has been laid on the statement that certain peoples have been met with who have no notion of God or of the soul, and who differ more from the Caucasian races intellectually and morally than they do physically.[1] This argument, we think, would be more conclusive—granting the fact of such ignorance—if it could be shown that such peoples could not, under education, acquire ideas of both. In criticising savage races, we should have an eye to our own, and not forget the profound ignorance on sacred subjects displayed by the lowest and most neglected of our population; nor should we forget the many instances of educated men, whose views on these subjects are near akin to those of the wildest and most ignorant races. The great majority of these races have some superstition, some fetishe, some object of, some kind of, worship. We do not know, were the argument in question to be used with logical exactness, where it would bring us. The Apostle of the Gentiles called the Athenians too superstitious, seeing an altar erected by them to the unknown God. What an approximation is thus indicated between the most intellectual people of antiquity and the rudest races of whom we have any knowledge! Were religious belief to be assumed as characteristic of species, how difficult it would be to define, how difficult it would be to enumerate them! To revert to the natives of Africa: they, if the circumstances under which the different peoples of that continent exist are taken into account, the weight of evidence, we think, will tend to show that the inferiority which they display as to intellectual progress is owing to local causes, of which slavery and the petty wars amongst the petty chiefs connected with this vile system are principal ones. All travellers who have penetrated far into the interior of that peculiar country are tolerably agreed that where the evils of slavery are least felt—where the government of the people is least tyrannical—where most stable—there the natives are most advanced. In reasoning on civilization and intellectual development, we repeat, we ought to keep constantly in mind certain well-known facts, such as what was the condition of the natives of our own country and of the greater part of Europe at a distant period; what is the condition of too many of them at the present time; what are the changes, the intellectual revolutions which have taken place in so many countries—in Egypt, in Greece, in India especially—justifying, we are disposed to think, a sentiment expressed by a writer in this volume already referred to—Mr. Snow—that "the actual difference between a savage and a civilized man is simply the degree of cultivation given to the mind." Let us not forget what Cæsar said of the Britons—that they were so stupid as to be unfit for slaves in Rome—a saying we were reminded of by Mr. Craft, at Newcastle, when protesting against the degrading view of his race taken by Dr. James Hunt. We have quoted in a preceding page a passage from the writings of one of the most philosophical and eloquent authors of our own times. In support of what we would wish to enforce, we must indulge in making another quotation from him—one very impressive in relation to slavery, and also, as it seems to us, as regards unity of races :

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[1] Broca: Journal de la Physiologie, tom. iii. p. 431.

> "Il n'y a qu'une de dégré et non d'essence entre l'intelligence du noir le plus sauvage et celle d'un Humboldt ou d'un Newton; sa superiorite-acquise de certaines races ne peut en aucune façon justifier la tyrannie qu'elles prétendent exercer sur d'autres races. Partout où l'esclavage pèse sur une nature morale, perfectible, sur un libre arbitre capable d'être guidé par la conscience et la religion, il est un crime et une monstruosité; c'est là une vérité à laquelle toute âme honnête doit se rallier, et qui est plus solide que toutes les doctrines de l'ethnographie et de l'histoire naturell, aujourd'hui élevées, demain renversées."[1]

Here we must pause. The subject is a vast one; and though so much has been written on it, and by some of the ablest men, we appear to be only on its threshold. The cranial cavity with its contents, by a recent author, Professor Filipi, has been called "an abyss of the greatest mysteries"—an expression we think applicable to the whole subject. The connexion of matter with mind, of the brain with the intellectual functions, the due exercise of these functions with the heart's action, the heart's own action with the aeration of the blood, and that with nervous action, form a wonderful circle; and within this circle another presents itself—of nourishment, of growth, of waste, of repair—as marvellous, and well may they be called mysterious. The same author, we may add, advocates the unity of origin of man, and considers it necessary, from merely anatomical considerations, to re-establish the order of primates—a necessity which seems to us a fairly logical conclusion, and on the ground also of probabilities the most probable, that is, on the old doctrine, that species are not varieties, are distinct entities, independent existences *ab origine*, liable to die out and disappear altogether, but not liable to any material metamorphosis.

We cannot part from this volume of the New Series of the 'Transactions of the Ethnological Society' without recommending it to the best attention of our readers. It is an alluring book; he who takes it up will be loth to put it down, and no one can read it without deriving, apart from amusement, instruction. Whoever reads it through must feel, we think, the force of the old Terencian passage, "Homo sum, humani nil à me alienum puto." Whether any reader will be disposed to extend a feeling of sympathy further, may, perhaps, depend on the views he may take as to the question of species just adverted to. For our own parts, putting aside the anthropoïd apes, we think that man is not degraded by admitting that brute animals have, though at a wide distance, a reasoning power, in various degrees, akin somewhat to his own, and affections of a kindly kind, somewhat analogous to his own, meriting his consideration, and prompting treatment such as humanity dictates.

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[1] Science et Philosophie, par M. Aug. Laugel, p. 272.

REVIEW VIII.

1. *Lehrbuch der Anatomie und Physiologie der Sinnes-Organe.* Von Professor ADOLF FICK, in Zürich. Mit 106 Holzschnitten und 5 Stereoscopbildern.—*Lahr*, 1864.

Text-book of the Anatomy and Physiology of the Organs of Sense. By Professor ADOLF FICK, of Zurich, with 106 Woodcuts, and 5 Stereoscopic Drawings.

2. *Beiträge über die Temperatur-Empfindung.* Von Dr. ADOLF FICK. ('Moleschott's Untersuchungen,' 1860.)

Essays on the Perception of Changes of Temperature. By Dr. ADOLF FICK, &c.

3. *Zur Lehre vom Tastsinnne.* Von Dr. G. MEISSNER. ('Zeitschrift für Rationelle Medicin,' Zweite Reihe, Band iv. p. 260, und Band viii. p. 92.

On Tactile Sensibility. By Dr. G. MEISSNER, &c.

4. *Bericht über die Fortschritte der Anatomie und Physiologie,* 1857—1863. (Henle und Meissner.)

Reports on the Progress of Anatomy and Physiology for the years 1857—1863 *inclusive.*

5. *Der Tastsinn der Fusssohle als Equilibrirungsmittel des Körpers beim Stehen.* Von Dr. W. HEYD.—*Tübingen*, 1861.

On the Importance of the Sense of Touch possessed by the Sole of the Foot in preserving the Equilibrium of the Body. By Dr. W. HEYD.

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Researches on the Influence of Exercise on Tactile Sensibility. By Dr. A. W. VOLKMANN.

9. *Untersuchungen über die Dauer der Tast-Eindrücke.* Von Prof. G. VALENTIN. ('Archiv f. Physiologische Heilkunde,' Band xi. p. 438.)

Investigations on the Durations of Tactile Impressions. By Dr. G. VALENTIN.

10. *Observations on the Tactile Sensibility of the Hand.* By Dr. E. Ballard. ('Medico-Chirurgical Transactions,' vol. xlv. 1862, p. 225.)

11. *Zur Lehre vom Raumsinn.* Von J. Czermak ('Sitzungsbericht der Wiener Akademie,' Band xvii. p. 563), *und Ideen sur Lehre vom Zeitsinn* ('Bericht der Wiener Akademie,' Band xxiv. p. 231).

On the Perception of Space and Time. By Dr. J. Czermak.

12. *Ein neues Verfahren die Schärfe des Drucksinnes der Haut zu prüfen.* Von Dr. F. Goltz. ('Centralblatt für die Medicinischen Wissenschaften, 1863, No. 18.)

A New Method of determining the Acuteness of the Sense of Pressure in the Skin. By Dr. F. Goltz.

13. *Untersuchungen über den Raum- und Temperatursinn bei verschiedenen Graden der Blutzufuhr.* Von M. Alsberg. Dissertatio. *Marburg,* 1863.

Researches on the Degree to which the Perceptions of Temperature and Space are affected by the supply of the Blood. By M. Alsberg.

14. *On the Cutaneous Sensibility of the Hand and Foot in different parts of the surface as tested by a Continuous Galvanic Current.* By Mr. H. Lobb. ('Proceedings of the Royal Society,' No. 45, p. 356.)

15. *Veränderungen der Hautgefühle unter dem Einflusse Elektrischer Reizung.* Von Dr. Nadjeschda Suslowa. ('Zeits. f. rat. Med.,' Band xvii. p. 155.)

On Variations in Tactile Sensibility under the influence of Electrical Excitation. By Dr. Nadjeschda Suslowa.

16. *Untersuchungen über das Gefühl im Munde mit besonderer Rücksicht auf den Geschmack.* Von Herren A. Stich und Klaatsch. ('Archiv f. Path. Anat. u. Physiol.,' Band xvii. p. 80.)

Researches on the Tactile Sensibility of the Mouth, with special reference to the sense of Taste. By Messrs. A. Stich and Klaatsch.

In the October number of this journal for 1863 a short account was given of some of the principal advances that have been lately made in the description of the minute Anatomy of the Skin, and also in regard to its functions as a secretory organ. In the present paper an endeavour will be made to place before our readers some of the more interesting facts and speculations which have been propounded of late years respecting its function as an organ of sensation. Although the skin may truly be regarded as the essential organ of touch, by the employment of which we become acquainted with the various physical qualities of the material world around us, yet this sense does not appear to be so completely limited to the skin as that of vision is to the eye, or as hearing is to the ear. A dull kind of feeling, which has been termed common sensation, and which seems to be only a feebler manifestation of proper tactile sensibility, is possessed in a state of health by nearly every part of the body, and under the same head have been classed a number of sensations, which, with the progress of inquiry, it is very possible we may find to have little or nothing in common; such are the sensations of hunger and thirst, nausea, sexual pleasure, muscular sensibility, and pain. In some of these cases it would appear that the sensation is rather subjective than objective—the stimulus in the case of thirst, for instance, proceeding from within, and being in fact only the indication of the general deficiency of fluid in the system: yet it is by no means improbable that the feeling may be connected with some alteration in the extremities of the nerves themselves, since the mere moistening of the throat with water will remove the sensation for a time, though from the primary cause being still in operation it soon returns. So, again, the sensation of nausea which is commonly excited by the sight or smell of some disgusting object, or by some peculiar kinds of rocking movement, appears to be essentially subjective in its nature, though it is easy to produce the same sensation by direct irritation, as by tickling the fauces, or by the introduction of certain medicinal substances into the stomach.

That the mucous membranes possess a considerable amount of tactile sensibility is well known, and we have ready proof of it in the sensations which accompany the descent of ice or hot liquids into the stomach or their injection into the rectum, though some are of opinion that the peculiar feelings then experienced are due to the change of temperature being felt through the surrounding textures by the adjoining cutaneous nerves. Stich and Klaatsch have however shown that in regard to the mucous membrane of the mouth there are in different parts very different degrees of tactile sensibility; the acuteness of sensation diminishing, for the most part, from the tip of the tongue outward in all directions, the accuracy of the perception being about the same for the gums, inner side of the lips, and root of the tongue.

> "The sense of feeling proper," says Ludwig, "is excited whenever impressions are made upon those parts or surfaces of the body which are supplied by the posterior roots of the spinal nerves, or by the sensory fibres belonging to the trigeminal, the glossopharyngeal, vagus, and accessory nerves. Between these several nerves an agreement and a difference exist: they agree in that all are capable of conveying sensations of tickling and of pain; they differ in that only a certain number are able to transmit distinct impressions of contact, pressure, and temperature."

The sense of touch over the body generally seems to attain its highest development in man, for though there may be isolated regions in other animals which are more highly endowed with tactile sensibility, yet no animal amongst the higher classes can bear comparison with him in the delicacy of the skin, the rich distribution of nerves to the papillæ, and the general smoothness and freedom of the greater part of the surface from hair or other appendages.

Amongst the various sensations which are perceived by the sense of touch, some, like those which we denominate sensations of roughness and smoothness, hardness and softness, elasticity, weight or pressure, vibration, and tickling, are readily acquired by practice from impressions received through the nerves of touch alone. Others, again, like those connected with the movement, extent of surface, number, situation, direction, and form of external objects, though capable of being accurately acquired by the sense of touch alone, are yet usually obtained by the co-operation of the eye, or, at all events, are then most readily and perfectly gained. In all these cases, however, there can be but little doubt that the impressions are conveyed from the sentient surface to the conscious mind by the same order of nerve-fibres. But there is still a category of sensations—those, namely, which are connected with variations of temperature—which present so many points of difference from those already mentioned that many have supposed, though, from circumstances we shall hereafter consider, we think erroneously, a different set of fibres to be implicated in their transmission.

Whether the feelings of pain are to be regarded as resulting from the over-stimulation of ordinary sensory fibres, is a point that, strange as it may appear, has been called in question by some observers; Dr. Sieveking, for instance ('Medico-Chirurgical Review,' October, 1858), has been led to doubt this explanation of the nature of pain from the phenomena presented in certain cases of hyperæsthesia, in which a condition of exalted sensibility of the skin to pain was present, though its tactile sensibility, as indicated by the increased distance to which it was requisite to separate the points of a pair of compasses before they were felt as distinct, was remarkably diminished. An opposite condition has been sometimes observed in certain stages of the action of anæsthetic agents, where sensibility to impressions of contact was present, though incisions into the body appeared to be unaccompanied by pain. From these considerations Dr. Sieveking is disposed to believe that impressions of pain are received by different organs at the point of contact from those which yield impressions of tactile sensibility.

It seems more probable, however, that the two kinds of impressions, tactile sensibility and pain, are conveyed to two distinct parts of the brain, the functions of one of which may be abolished either by disease or by the inhalation of anæsthetic agents, without the activity of the other being impaired.

In considering these subjects we shall, for the most part, follow the sequence in which they have been discussed by Fick, whose work, cited at the head of the foregoing list, is by far the most complete and accurate description of the various forms of tactile sensibility, as well as of the other special senses, that we have hitherto seen.

The arrangement pursued by Fick is as follows:—He first enters into a disquisition upon the general theory of the sense of touch. 2. He then considers in order the sense of pressure or weight possessed by the skin. 3. The sense of changes in temperature. 4. The sense of space or of locality; and lastly, 5. Common sensation. By this means a good general view of the physiology of the skin may be obtained, and the results of the numerous experiments that have been made upon it can be appropriately considered. The stimuli by which the nerves of tactile sensibility may be excited vary considerably in their nature. The sentient extremities of the cutaneous nerves, and of those nerves that are distributed to mucous membranes, are, with few and doubtful exceptions (Schneiderian mucous membrane, tongue), invested by a tolerably thick coating of epithelial cells, and they are consequently not commonly nor easily acted on by chemical agents. In some instances, indeed, vapours will act powerfully, as when ammonia is inhaled, or sulphide of carbon vapour is applied to the conjunctiva, or when carbonic acid gas comes into direct contact with the laryngeal mucous membrane; but, as a general rule, the thickness of the epithelial investment is so great as effectually to ward off injurious influences of this nature; and therefore, unless their operation be protracted, more than sufficient to prevent the excitation of any sensation.

Although the imponderable agents, heat and electricity, are capable, as we shall presently see, of producing sensations, it is certain that the activity of the cutaneous nerves is commonly called into play by mechanical irritation. The degree of mechanical irritation that may be applied varies from the slightest contact to the complete crushing or disorganization of the nerve. In the slighter degrees, the impression produced is merely that of contact, or a feeling akin to tickling, which, when the stimulus is somewhat stronger, passes into that of pressure. When still more powerful irritation is applied, pain of a dull and heavy character is occasioned, resembling that of contusion when the compressing body is obtuse, but acute and lancinating when it is sharp. Division of the cutaneous nerves is usually accompanied by severe pain; yet if this be effected with extreme rapidity, as in cases of gunshot wounds, or with extreme slowness, as in some cases where sensory nerves have been cut through by ligature, little or no pain is experienced.

Sense of Pressure.—The sense of pressure is based upon the perception of the resistance which is offered by any part of the body to a stimulus applied to it. The first point which naturally suggests itself in the consideration of this faculty is, to determine the smallest amount of pressure which is capable of producing a sensation. Fick observes that there are two groups of conditions which modify the amount, one of which is the thickness and density of the parts lying between the surface of the skin and the terminal corpuscles; and the other consists in the varying sensibility of the extremities of the nerves themselves in different parts and at different times. Experiments on this subject may be conveniently performed in the method adopted by Aubert and Kammler—that, namely, of employing small light cylinders of some substance possessing bad conducting powers for heat. These may be suspended by a cocoa-nut fibre, and allowed gradually to fall plumb on the part, which should itself be well supported. The eyes must, of course, be bandaged. In a considerable series of such experiments undertaken by the above-mentioned observers, the cylinders used were made of elder-pith, and presented a superficies of 9 square millimetres. The numbers in the following table indicate the number of milligrammes (= ·015461 of a grain) required to produce a sensation.

Part of the Body.	Observers.					
	A.			B.		
	Right Side.		Left Side.	Right Side.		Left Side.
Forehead, temples, muscles of the ear, nose, cheeks	—	2	—	—	2	—
Eyelids	—	5	—	—	2	—
Lips and chin	—	5	—	—	15	—
Belly	—	5	—	—	5	—
Back	—	15	—	—	5	—
Upper arm (front)	—	5	—	—	5	—
„ (back)	—	10	—	—	5	—
Forearm (middle of anterior surface)	—	3	—	—	5	—
Palm of hand	5	—	3	—	35	—
Palmar surface of index finger, Phalanx I.	35	—	15	115	—	15
„ II.	15	—	15	115	—	15
„ III.	35	—	15	115	—	111
Forearm, dorsal side	—	2	—	—	5	—
Dorsal surface of index finger, Phalanx I.	5	—	2	5	—	10
„ II.	35	—	15	115	—	115
„ III.	35	—	15	115	—	115
Plantar surface of 2nd toe	—	—	—	—	—	—
Dorsal surface of 2nd toe, Phal. I.	515	—	115	—	515	—
„ „ II. & III.	115	—	65	—	115	—
Nails of hands and feet	115	—	65	—	215	—

The remarkable differences in sensitiveness displayed by different parts of the skin in these experiments are probably due, not so much to variations in the sensitiveness of the nerves, but to differences in the thickness of the epidermis, and in the degree of its rigidity. An explanation of the much more acute sensibility of the forehead, as compared with the thinner skin covering the eyelid, must be sought for in the circumstance that the former is provided with hairs, the oblique insertion of which causes them to act like levers when they are pressed upon by the descent of the weight, whilst at the same time the weight is concentrated on a smaller space. The importance of this circumstance is shown in the following table :—

	A.		B.	
	Shaved.	Unshorn.	Shaved.	Unshorn.
Left forearm	2	15	3	10
Dorsum pollicis, Phal. I.	5	65	5	35
„ indicis, Phal. I.	2	35	5	15

The equal sensibility of the palm of the hand and eyelid, notwithstanding that both are destitute of hair, and that the former has an epidermis many times thicker than the latter, is attributable to the circumstance that the palm of the hand possesses a much larger number of those peculiar bodies whose special function it is to receive impressions of pressure.

As regards the essential independency of the sense of space from the perception of the amount of pressure applied, Aubert and Kammler found that the same appreciation of space, or, in other words, the limits of confusion for tactile impressions on the forehead, upper and lower arm, back of the hand and thigh, was the same, whether the weight was 3 or 1000 grammes. Moreover, the exactitude of the perception of the precise spot touched was in nowise affected by the amount of pressure exerted.

Fick observes that the sensation of pressure is produced not only at the instant at which the weight is applied, but as long, within moderate limits, as the skin is compressed; though ultimately, no doubt, the nerves may become exhausted, and cease to convey any impression. The mode of producing sensation by dragging the skin is the opposite to that occasioned by its compression, though it can scarcely be distinguished from it, since it constitutes a stimulus by which nerve-fibres are brought into activity in the same order as by compression. Still, it is usually possible to tell whether traction is being made upon a hair, and even the direction in which it is pulled. The sensation of pressure is persistent for some time after the removal of the compressing weight, partly, perhaps, because the skin does not immediately recover itself, partly because, as in the case of the other senses, a certain period elapses before the nerve once excited again recurs to a condition of rest. Valentin has shown that if a spiked wheel be made to rotate on the hand or other sensitive part with a sufficient degree of rapidity, the impressions produced by the successive blows of the teeth are no longer separately distinguished, the wheel appearing to the mind to have a plain border. This occurs when the rapidity of rotation is such that not more than 1-640th of a second intervenes between the successive strokes. When the skin was tumid and swollen from immersion in water the interval might be somewhat increased with the same result; but when it was covered with tracing-paper, the after-impression was of shorter duration.

Another question that has been suggested by Weber is the following: Suppose a certain weight or pressure be already applied to the skin, what additional pressure must be made in order to be distinctly perceived? or, in other words, what is the delicacy of our sense of differences of pressure? In the first place, it is natural to expect that considerable differences should exist between different people, and also that the length of time allowed to elapse before the comparison is made would materially influence the result. Further, a difference might be expected according to whether the pressure is made on the part whilst well supported, or whether the muscles are allowed to be exerted; the accuracy of perception being much greater in the latter case. In the experiments carried out by Weber it was found: 1. That much smaller differences could be distinguished when the two weights were applied *successively* and *immediately* to the same spot, or even to different spots of the skin, than if they were applied *coincidently* to different though perhaps equally sensitive parts, the recollection of the former weight being more acute than even the present comparison. In many persons, however, the lapse of 10 seconds was sufficient materially to invalidate the judgment. Weber distinguished a 14-oz. or even a 14½-oz. weight from one of 15 ounces after the lapse of 15–30 seconds, if they were placed on the same spot. After 40 seconds he was unable to distinguish which was the heaviest. When the difference between the weights was considerable, as 4:5, the heaviest could be accurately distinguished after 90 seconds. Weber found that the proportion of 14·5:15 or 29:30 was about the smallest difference that could be detected by the sense of touch alone, and he observed the curious fact that this ratio holds both for heavy and light weights, so that supposing ounces to be employed, a whole ounce must be subtracted or added to 30 oz. in order to be distinguished, whilst if drachms be employed, the addition or subtraction of a drachm only is required.

When the sense of muscular tension was allowed to come into play, as when the weights were placed in the unsupported hand or lifted from the ground, whilst concealed by a cloth, the proportion between the two weights might be reduced as low as 39:40 without any difficulty being experienced in distinguishing which was the heaviest. According to Fick, Fechner (whose book we have been unable to obtain, though there is a good review of it in Henle and Meissner's Bericht for 1860) has made a very extensive series of researches upon the capability of distinguishing weights. His method consists in estimating which is the heavier of two weights that are successively raised. For every two weights this must be frequently tried, and the number of correct and incorrect estimates carefully noted. On the theory of probabilities a measure can be thus obtained numerically representing the power of distinguishing differences in weight. The general result obtained by Fechner from his experiments was essentially confirmatory of Weber's law that, within certain limits, the perceptibility of difference in weights is universally proportional to their amount.

Lotze,[1] however, maintains that this only holds within certain limits, so that though it is possible to distinguish 29 from 30 decigrammes (a decigramme = 1 grain and a half), it is not possible to distinguish accurately 29 from 30 kilogrammes (a kilogramme = 2·2 lbs. avoirdupois).

Weber found that some differences existed in the power of distinguishing weights in different parts of the body, though not to any great extent. Thus, a weight laid upon the finger appeared heavier than when placed on the forearm.

In the experiments undertaken by Dohrn, resembling those of Weber, a rounded pencil of one millimetre diameter was attached to one arm of a pair of scales, and being weighted with one gramme was allowed to rest on the skin. This primary pressure was then increased or diminished until a difference could be clearly discerned, the oscillations of the beam being as far as possible avoided. He found that smaller differences were distinguishable when the primary weight was diminished than when additions were made to it; that the sensibility of the arm for difference of weight gradually diminished from the fingers to the elbow; and that the anterior surface of the limb was more sensitive than the external and posterior, except in the case of mechanics engaged in rough work, the palmar surface of whose hands was covered by a thick epithelium. Amongst the fingers the second and fourth were most sensitive, the third and fifth the least, and the thumb possessed an intermediate degree of acuteness. The third phalanx of the fingers was more sensitive than the second, the second than the first, and the perception of the radial side was somewhat more delicate than that of the ulnar. The average of a considerable number of experiments showed that with an incipient pressure of one gramme (15·44 grains) an increase of 6·8 grains was perceived by the point of the forefinger, of 9·8 grains by the palmar surface of the hand, and of 13·2 grains by the forearm. Again, when various weights were allowed to rest on the back of the well-supported hand, the pressure being exerted on a circle of 26 millimetres (1 inch) in diameter, if the original pressure was 5 grammes a difference of 2 grammes was discovered, if the original pressure was 10 grammes a difference of 5 was perceptible, if 15 of 7, and if 22 of 9.

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[1] Medizin. Psychologie, p. 208; and Meissner-Anat. und Physiol. der Haut, p. 33.

Fick, in criticizing the foregoing experiments of Dohrn, observes that the results are unsatisfactory, because he has not made allowance for the effects of exhaustion. By beginning with a definite pressure, which is applied for a considerable period to the skin, the sensitiveness of the extremities of the nerves soon becomes exhausted, and hence it is not surprising that in some instances he found it requisite to double and even treble the primary weight before any perception of a change of weight was produced.

Heyd has made some curious observations, showing that the sensibility of the sole of the foot to pressure is of considerable importance in the preservation of the balance of the body in the act of standing, and especially in the position termed by the French "position hanchée," or crouching. In these experiments a pencil was attached vertically to the head, the movements of which were indicated on a reddened glass plate. Now, if the sole of the foot was rendered anæsthetic by the application of chloroform or of moderately cold water, the oscillation or vibrations of the pencil instantly became much more strongly marked, especially in the latter case. It is probably to the loss of sensibility in the sole of the foot that we must attribute, in part at least, the unstable gait of those who are paralysed. Such persons are unconscious of the exact position of the foot, and are unable without the aid of sight to determine whether the foot is placed flatly on the ground or not, and are therefore incapable of properly balancing the body. The sensitiveness for variations of pressure Heyd found to be greatest over the head of the first metatarsal bone, and least on the outer edge of the foot. The acutest perception of distance (sense of locality) was also over the head of the first metatarsal bone, then over the heel, and finally over the metatarsal bone of the little toe.

Sense of Space.—The fineness of the sense of touch in different people and in different parts of the body, for impressions of contact, was also subjected to experimental inquiry by Weber, the means employed being, as is well known, the discrimination of the points of a pair of compasses tipped with cork. It was found that these could be approximated much more closely before the limit of confusion was attained in some parts of the body than in others. The most acutely sensitive region, according to Weber, is the tip of the tongue, where the limit of confusion, or the point where the perception of the points as being separate and distinct ceases, is as low as half a line, whilst the least sensitive parts are found on the outer surfaces of the limbs generally, and on the back, where the points can be separated to the extent of thirty lines, or more than two inches, and yet give only a single impression. A complete table of Weber's observations is given in Müller's Physiology (translated by Dr. Baly), as well as in Dr. Carpenter's 'Human Physiology,' and in his excellent article on the "Sense of Touch," in the 'Cyclopædia of Anatomy and Physiology.'[1] As these sources of information are readily accessible, we shall not transcribe the measurements given there. An important and very carefully conducted series of experiments on this subject has been recently carried out by Dr. Ballard, and the conclusions he has arrived at are contained in a paper read before the Royal Medico-Chirurgical Society.

Now, Weber observed that the limit of confusion is always less in the transverse than in the longitudinal direction of the limbs, the differences in some instances being of very considerable amount. Thus, in the case of the arm and thigh the limit of confusion in the longitudinal direction was thirty lines, or in some instances much more, whilst in the transverse it was only from sixteen to eighteen lines. In view of these observations, Dr. Ballard, whilst pursuing the method of testing with compass points tipped with cork employed by Weber, endeavoured to obtain an accurate representation of the tactile sensibility of the part by measuring in both directions, and taking the *sum* to exhibit the absolute sensitiveness of each spot. Dr. Ballard's experiments were limited to the hand alone, and no less than two hundred and eighty-four observations were made.

Amongst the more important conclusions at which he has arrived are, that the order of sensibility of the different fingers, taking the mean of each, is—index, little, middle, ring finger, and thumb. That the borders of the hand are, as a rule, highly sensitive; the radial being somewhat more so than the ulnar, and exceeding even the palmar surface of the hand, the sensibility of which is about equal to that of the ulnar border, and considerably exceeds that of the dorsal surface.

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[1] See also certain remarks upon the observations made by Weber, Valentin, Allen Thompson, Belfield Lefevre, Graves, and others, on the sensibility of the skin in health and disease, by Dr. John W. Ogle, in vol. i. of Beale's Archives of Medicine, p. 321; also (loc. cit.) the description of a compass (Aphemetric, or, more properly, Di-aphemetric) "for measuring the degree of discriminative power, as regards contractile impressions, enjoyed by the skin and mucous membranes in certain affections of the nervous system." See also Medical Times and Gazette, 1858.

That the tips of the several fingers are the most acutely sensitive parts of the whole hand; this reaches its acme in the tip of the first finger, which is represented by the number 0·35 inch. That the least sensitive part is on the dorsal surface of the hand over the base of the fifth metacarpal bone, where it equals 5·0 inch, and the mean sensibility of the entire hand is represented by the number 1·384 inch. Next to the tips of the several fingers, their radial and then their ulnar surfaces are most sensitive, except in the case of the little finger, the ulnar surface of which, constituting the border of the hand, is, for reasons of obvious utility, most acutely sensitive. The sensibility of the ulnar surfaces of the fingers diminishes from the little to the first finger, whilst, on the contrary, the sensibility of the radial and palmar surfaces, which is low in the little finger, increases towards the first finger, where it attains its maximum. The sensibility of the adjoining sides of the fingers is such that any object would be felt better when placed in the interval between the index and middle fingers than between any of the others. In reference to the thumb Dr. Ballard regarded it as destitute of a metacarpal element, and when considered as a whole, the order of sensibility of its surface was palmar, radial, dorsal, ulnar; but when only the free portion was taken into account, the order was radial, palmar, ulnar, and dorsal surface. In the case of the fingers the order was generally radial, palmar, ulnar, and dorsal surface, except, as already mentioned, on the little finger, where the ulnar side is more sensitive than the radial.

The delicacy of the sense of touch appears to be greater in children than in adults, a circumstance which is probably referrible to the greater softness and delicacy of their epidermis. Some interesting experiments on this point were made by Czermak, the subject being a boy of twelve years of age. On applying the points of a pair of compasses in the way recommended by Weber, it was found that though the sensibility of the tip of the tongue was no greater in the boy than in the adult, yet that the lips could distinguish the two points when only three-fourths of a line apart, whilst in the adult they were first distinguished as separate when they were two lines apart. Over the point of the little finger the proportionate distances of the points were as 0·75 : 1 in favour of the boy, over the metacarpal bone of the thumb as 3 : 4, over the dorsal surface of the first finger as 4 : 7, over the back of the hand as 10 : 14, on the sternum as 15 : 20, and on the back of the neck as 16 : 24—all in favour of the youth. Goltz in a series of analogous experiments made upon five children of from eight to fourteen years of age, obtained results which are not quite in accordance with those of Czermak as to the absolute diameter of the "limit of confusion." This may have been dependent, however, on individual peculiarities, and he agrees in the general conclusion that the sense of feeling is more acute in the young than in the old.

Czermak observes that the delicacy of the tactile sense is diminished when the surface is either naturally or artificially stretched. Thus, it is diminished in the skin of the abdomen during the later months of pregnancy, and possibly the finer sense of children as compared with adults is due to this circumstance, for whilst the general surface of the body undergoes increase with advancing age, there is no evidence that the absolute number of nerve-tubules undergoes a corresponding increase; and it follows, therefore, that the same fibres have to cover a larger extent of surface, which necessitates a corresponding diminution of acuteness.

According to Lichtenfels,[1] the sense of locality resident in the cutaneous nerves is dulled by narcotic drugs, and Bernard[2] has pointed out that the same effect is observable in anæsthesia, whilst in hyperæsthesia the acuteness of perception is increased.

The mode of investigating the sensibility of the skin adopted by Czermak appears not to have attracted the attention of previous observers. He has shown that the points of a pair of compasses may be much more closely approximated to one another, and still distinguished as being separate, if instead of their contact being made simultaneously, it is made consecutively, first one and then the other being applied. The numerical results obtained by Czermak are shown in the following table:

		Consecutive, in lines.	Simultaneous, in lines. *a*	Simultaneous, in lines. *b*
Woman, aged 26	Back of hand	1·7	5·1	6·9
	Middle of dorsal. Surface of forearm	2·0	8·5	11·1
Man, aged thirty	Back of hand	1·9	7·0	9·2
	Middle of dorsal. Surface of forearm	4·0	9·0	12·7
Middle of outer surface of upper arm		4·8	12·5	17·6

In this table, which expresses the mean of 35 observations, the column under *a* shows the extreme limits to which the points might be separated, and still only give a single impression; whilst the column *b* gives the distance at which they could be distinguished as two without hesitation.

The influence of exercise on the delicacy of the sense of touch has been investigated by Volkmann and Fechner, who have shown that the acuteness of perception in various spots of the hand and forearm first improves slowly by practice, then very rapidly, so that it is nearly doubled, or even quadrupled, in the course of a few hours, and finally, having reached a certain point, improves with exceeding slowness. Different parts of the skin exhibited a considerable difference in their capacity for improvement by exercise, the palmar surface of the tips of the fingers, for example, improving only slightly and tardily, probably from the attention having been already and habitually directed towards them, whilst a rapid and considerable improvement was observed in the skin of the upper and forearm. Remarkable variations in the capacity for improvement were also observed in different individuals. It was remarked that, however highly the acuteness of perception was raised by practice in any part, neglect of exercise soon reduced it to its original condition, so that, even after the lapse of twenty-four hours, a difference was perceptible. In one series of experiments the limit of confusion was observed to be before exercise 1‴ on the point of the third finger, and 8‴ on the palm of the hand; after a few hours' practice the sensibility of the skin in these parts had so much improved that the limit of confusion was reduced to 0·6‴ in the former and to 2‴ in the latter part.

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[1] Lichtenfels in Wiener Sitzungs-Berichte, xvi. 3.

[2] Brown-Séquard, in Journ. de la Physiologie, tom. l. p. 344.

It does not seem improbable that the improvement just mentioned may be due to an increased flow of blood taking place through the capillaries, resulting in part from the frequent irritation applied, and partly from the attention being directed towards the particular portion of the skin experimented on, the effect of which would be to heighten the vital properties of the nerves, and, temporarily at least, improve their tactile sensibility. This explanation is at least supported by the observations of Alsberg, which show incontestibly that the delicacy of the sense of touch in distinguishing between two points is materially affected, both on the palm of the hand and on the sole of the foot, by the vascular condition of the part—whether the quantity of blood be increased by pressure on the veins, or diminished by elevation of the limb, the former condition causing the more important modifications. The effects were strongest in those parts where the skin rested on muscles, and least in those parts which were connected with aponeuroses. The acuteness of sensibility for temperatures not differing to a very marked extent from blood-heat diminished somewhat in hyperæmic conditions, but was slightly increased in the anæmic state. In full accordance with the above are also the observations of Wroblewsky,[1] who states that he found the acuteness of the sense of touch to be somewhat exalted in the hot stage, when compared with the period of intermission of ague, whilst it was remarkably diminished in the cold stage. A very curious observation was made by Volkmann in reference to this subject, showing that when the finger or any limited portion of skin on one side of the body is frequently experimented on, and its tactile sensibility by this means materially exalted above the level of that of the surrounding parts, the symmetrical part of the skin on the opposite side of the body will also be found to be almost, or quite as acute. Fick observes that this fact is destined to play an important part in the development of our views on general physiology, since he believes it indicates that the improvement from practice takes place, not so much in the sentient extremities of the nerves as in the nerve centres themselves, or perhaps in our power of directing the attention of the mind to the impressions received. But if, as Brown-Séquard has shown, an increased or diminished flow of blood on one side of the body has a tendency to cause a similar condition in the capillaries of the corresponding part on the opposite side, it seems to be quite within the bounds of possibility that it is to this circumstance that we may attribute the effects observed in this instance. At any rate, analogous experiments with the eye are unsuccessful, since they are soon followed by congestion of the vessels and exhaustion of the retina. Both Czermak's and Goltz's experiments on the blind show, as might be anticipated, that they uniformly possess, evidently as the result of constant practice, a sharper sense of touch than those who are endowed with sight.

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[1] Schmidt's Jahrbucher, 1863, p. 158.

As a consequence of the limit of confusion being much lower in the more sensitive parts of the skin, it follows that if the points of a pair of compasses perceived as single on the upper arm be drawn downwards to the fingers, they will at first give the impression of a single line, but subsequently they will appear to separate, and ultimately be distinctly perceived as two. In a similar manner, the velocity of movement seems to increase when a point is made to travel at a constant rate from a less to a more sensitive part.

Another ingenious mode of testing the sensibility of the skin in different parts for tactile impressions has been practised by Weber. It consists in lightly pricking the skin with a knitting-needle dipped in ink, and immediately endeavouring, with closed eyes, to touch the same spot with a second needle. It was found from many observations that the exact spot could be most accurately indicated in those parts of the skin which were most sensitive. Thus, the limit of error was 7 lines on the front of the thigh, 2·9 lines on the back of the hand, 1·9 on the palm, 0·5 of a line on the tips of the fingers and lips. Fick remarks that the movement of a single point is distinguished within the limits of confusion of two points; so that when, as on the forearm, the limit of confusion at the points is 18‴, the movement of one of them will be perceived long before it has traversed a circle of that radius; and this he attributes to new circles of sensation being constantly affected by the movement of the points.

The general theory of the nature of common sensation promulgated by Fick, and based on the foregoing experimental results, may be thus expressed. Every nerve-fibre dedicated to the transmission of impressions of common sensation, or tactile sensibility, conveys in all instances a sensation of the same quality, whatever may be the nature of the stimulus arousing it to activity; and in all instances, if the intensity of the stimulus be sufficiently great, pain will be produced. The most common mode of excitation is by mechanical irritation; and this may act either by exerting a certain amount of direct pressure or by traction, which again is probably only another mode of applying pressure. The application of varying temperature, which is a less frequent stimulus, probably acts like mechanical irritation, by exerting a certain amount of pressure on the sentient extremities of the nerves, which is effected by the contraction or expansion of the epithelial and cutaneous structures surrounding them. Every nerve of common sensation, when irritated, impresses an idea of definite locality or space on the mind, though the position or situation of the precise point irritated on the surface of the body is undoubtedly learnt by experience. When the extremities of several nerve-fibres having a certain topographical disposition are simultaneously excited, an apparently single, but really compound, sensation is produced—a feeling, in the ordinary sense of the word—a feeling of pressure or of temperature; and it is possible that the mind may recognise the distinction between these two stimuli by some such process as the following :—A feeling of temperature arises if the intensity of excitation of the several nerve-fibres very gradually increases or decreases from a certain point; so that between any two elements, *a* and *b*, no fibre lies, the intensity of the excitation of which does not lie between that of *a* and *b*. A feeling of contact, on the other hand, arises if this condition be not fulfilled. Or, again, if the extremities of the nerves ending in the deep-lying terminal corpuscles be immediately excited by a given stimulus, experience must soon teach the observer that strong mechanical pressure must have been applied, since a greater or less period of time must ordinarily elapse before they can be excited by variations of temperature.

That we recognise the degrees of severe pressure by the deeply-seated terminal corpuscles seems to be borne out by the fact that, owing to the inferior development of the cutaneous papillæ, and consequently of the superficial nerve-fibres in cicatrices, these are, to a great extent, insensible to changes of temperature, or to moderate pressure, whilst severe degrees of pressure are readily felt in such parts, and are correctly referred to their origin. Now, from the results of minute anatomical investigation, it is certain that every sensory nerve terminates in a variable number of extremely minute filaments, each of which ends in one form or other of terminal corpuscle. We may thus conceive the skin to be mapped out into a number of territorial or regional divisions, each of which corresponds to the ultimate branches of a single fibre. The irritation of a stimulus applied to any one of these terminal filaments being conveyed along the *same* nerve-trunk from which they all spring, would clearly produce the same impression of locality on the mind; and even in the event of two or more being touched, the feeling excited would be only one of increased intensity, but there would be no power of differentiating the impressions. The question, then, arises, Is it, under all circumstances, an absolute matter of indifference whether this or that ultimate division of a nerve-fibre be stimulated? And the answer is, that it would certainly be of no importance to what part of a particular sensory circle a stimulus was applied, supposing that the filaments of only one nerve were contained within it. But this is probably not the case. The innumerable plexuses and connexions established between the terminal branches of different sensory nerves lead us naturally to expect that in the sensory circle of a fibre, *a*, the terminal corpuscles of other nerves, as those of *b* and *c*, are also distributed. The accompanying Fig. (from Fick) may serve to explain this. Here *a* represents the circle in which are contained all the terminal fibrillæ of a single sensory nerve; *b* and *c* the sensory circles of others. At a^1 is now a terminal corpuscle, which receives a branch from *a*; whilst close to it is another, *β*, from the fibre *b*. If in this region of the sensory circle of *a* a stimulus be applied, it will obviously excite, not only a sensation which will be conducted through *a*, but also another through *b*. A stimulus, on the other hand, acting on the upper part of *a*, as at a^2, will not only excite the branches of *a*, but also those belonging to *d*. In both instances a compound sensation will be excited, which clearly cannot produce the same impression on the mind. It must be remembered that not two or three only, but numerous sensory circles thus interpenetrate a given circle on every side, and consequently that, with every subject, a different impression is produced wherever the circle may be touched. Again, if the stimulus applied affects a^1 and a^3 coincidently, the idea of continuity is always produced, for the sensation is compounded of impressions derived from the sensory circles *b*, *a*, *d*, which constantly succeed one another in the picture of space formed in the mind. This can be generalized in the following proposition:—Two separate coetaneous stimuli, as the contact of two points, produce a single sensation whenever they are included within the limits of a single sensory circle. On the contrary, the two points are perceived as distant when they lie beyond the limits of the common circle formed by the interpenetration of any two adjoining circles; or, as it may otherwise be expressed, separate impressions are produced when one or more unexcited sensory circles intervene between the points of contact, but not otherwise. Probably, under ordinary circumstances, several such circles must intervene for the due perception of the distinctness of the two points; and the improvement which is observable from practice and from special attention to the impressions derived from the sense of touch, as in the case of the blind, is probably due to the gradual diminution of the number of intervening circles, till the minimum is attained, beyond which no further improvement is practicable.

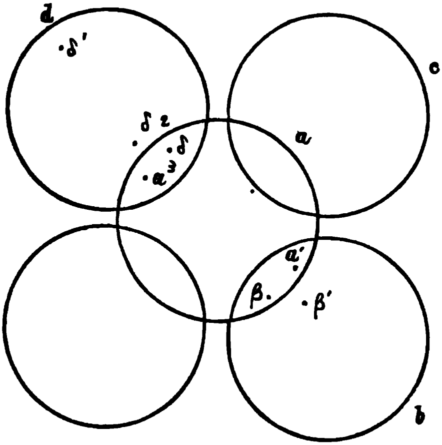

Fig. 1.

In some instances—as, for example, in the limbs—it is probable that the sensory region of each nerve-fibre is elliptical, and not circular, and this supposition will enable us readily to explain the circumstance alluded to, that the points of a pair of compasses can be better detected as being separated in the transverse than in the longitudinal direction.

Now, it might be supposed from the foregoing statement, that if two stimuli acted one at *a'* and the other at *δ'*, the perception of two points of contact would not arise, although the distance from a' to δ' is almost double the diameter of a sensory circle, because no complete unexcited sensory circle intervenes between them; on the other hand, the stimuli applied at β' and δ'' would be felt as distinct, although they are much more closely approximated than the former, because an entire unexcited sensory circle (a) intervenes between them, so that they are not included between the system a b, nor in that of a d. It might be also said that if the above theory were true, on drawing a pair of compass-points, closely approximated, over the skin, they would sometimes be felt as single, sometimes as double, according to whether there happened to be an unexcited sensory circle between them or not. Fick meets this objection by observing, that it must be recollected that, in the foregoing figure only three circles are drawn, for the sake of perspicuity, between a' and d', whilst actually many more intervene, each slightly overlapping the other, as shown in the adjoining cut (Fig. 2), where six entire circles lie between a' and d'. Here it is evident that it is only requisite to pass from a' to p' in order to leave a complete unexcited sensory circle between the two points, and hence it may be further observed that the required condition of leaving an unexcited sensory circle may really be fulfilled whensoever the distance between the two points slightly exceeds the limits of any one sensory circle. The diameter of the sensory circles above alluded to probably varies to a considerable extent in different regions; in some instances, as shown by experiment, being about 1 mm., or one twenty-fifth of an inch, in others not less than about one-third of an inch.

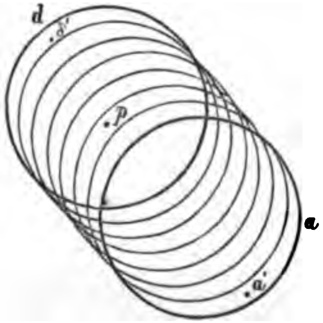

Fig. 2.

Sense of Temperature.—A simple experiment appears to show that the sense of pressure may be felt coincidently with that of temperature, for if we press with a cold finger against the forehead the double sensation of pressure and of cold is clearly perceptible. This, as Fick remarks, is one of the darkest points in the physiology of this sense, for it is impossible to ascribe the possession of two distinct "faculties" or "energies" to one and the same nerve-fibre. According to all our present and established opinions, a particular nerve must always convey the same impression to the mind, whatever may be the stimulus which excites it to action; at least, we know this to be the case with the nerves of vision and of hearing. Nor can we conceive that any fibre, simultaneously acted on by two distinct stimuli, should be able to transmit a simultaneous double or compound impression to the mind, as appears to be the case in the experiment just mentioned. Various hypotheses have been suggested in order to explain the phenomena in question. We may, on the one hand, conceive that there are distinct channels for the two sensations, neither of which is capable of transmitting the impression which constitutes the proper stimulus of the other—an opinion which receives weighty support from the circumstance that in certain cases of paralysis the nerves have been found excitable by moderate degrees of warmth, whilst they have been remarkably insensible to impressions of contact or pressure. Or we may conceive that there are certain nerves endowed with ordinary tactile sensibility, and capable of being called into play by mechanical irritation, which yet, by the peculiar mode in which they terminate,—as, for instance, in Pacinian bodies,—are capable of being so acted on as to convey to the mind impressions which we learn to associate with those of temperature. Or we may hold with Fick himself, that whilst every sensory fibre can convey only a single impression, rendering it impossible for the mind to determine whether the stimulus applied has been mechanical irritation or heat, yet because that mechanical pressure on the one hand, and variations of temperature on the other, are never limited in their operation to single nerve-fibres, it may be that thermic irritation affects a large number of fibres collectively in a different order or mode than impressions of contact. Thus it is not difficult to conceive that the latter kind of stimulus can rarely be so completely limited in its agency upon the peripheric extremities of the fibres as is the case with changes of temperature, but must always affect a greater or less extent of the trunk, except in those instances where the contact has been of the most gentle character; so that, in fact, what was originally only a quantitative difference comes by mere repetition and regularity of occurrence to be recognised as a truly qualitative difference. Fick supports his opinion by observing that the more nearly any given stimulus is limited in its action to a single nerve-fibre, the more difficult is it to distinguish between the impressions produced by heat and those by contact, as is shown in the close analogy of the sensations produced by a spark and a prick with a fine needle. Another circumstance, also, which he considers corroborates his theory that there is no essential difference between impressions of heat or cold and those of pressure, is the observation of Weber, that a cold body placed on the skin is estimated to be heavier than a warmer one; whence it follows that we unconsciously add the sensation of cold to that of pressure, a process that could scarcely be effected were not the impressions derived from the two stimuli, however different they may at first sight appear, fundamentally identical in their nature. Moreover, it may be remarked that both kinds of sensation may be easily raised to such a pitch of intensity as to be productive of pain, and that then it is in all instances impossible to distinguish one from the other. In a series of experiments undertaken by Fick and Wunderli, the close relationship existing between impressions produced by thermotic changes and by direct contact or mechanical irritation was very clearly indicated. They have shown that it is quite possible to mistake any grade short of actual pain of the one for the other. In the conduct of these experiments they first limited and defined the spot of skin to be tested by surrounding it with some badly conducting substance, as paper, the space left uncovered being in different instances from one-twelfth to one-fifth of an inch in diameter; then the eyes being bandaged, mechanical irritation and heat were applied in irregular sequence. The application of heat was effected by radiation from a hot rod of metal or by a burning-glass, whilst the mechanical irritation was caused by pressure with a piece of wood, a camel-hair pencil, or a flock of wool. The intensity of the stimulus was rarely carried in either instance so far as to produce pain, and in those cases where it was complained of the results were not registered. In these experiments it was found that an erroneous conclusion as to the nature of the stimulus applied was frequently arrived at. It was interesting, however, to observe that the more abundant the distribution of nerves to a part, the more accurate was the judgment formed, which is certainly in accordance with the theory proposed, since in these parts the application of either kind of stimulus must evidently affect a greater number of fibres, and consequently assist the mind in forming a decision. No error was made in any of the experiments in which the palmar surface of the hand was the part tested, nor any over the face; but when the back of the hand, which is much less liberally supplied with nervous filaments, was experimented on, it was found that 4 errors were made in 50 experiments by one person, and by another 2 errors in 45 experiments. Again, one observer made 3 mistakes in 48 experiments, where the part tested was the outer side of the forearm; another, 1 error in 31 experiments. On the back in one series of trials, 3 mistakes occurred out of 11; in another, 4 in 19. Lastly, over the spines of the lumbar vertebræ, one of the most insensible parts of the body, 6 mistakes were made in 29 experiments by one person, and no less than 4 mistakes out of 7 by another.

With the nerves of tactile sensibility the same law of excitation appears to hold good as with motor and other nerves, that, namely, they are only excited to action when a variation occurs in the intensity of the stimulus applied; so long as the strength of the stimulus is invariable, so long is there an absence of sensation. This has been remarkably evidenced in the interesting experiments of Meissner upon the sensations experienced on immersion of the hand or foot in fluids, as compressed gases, water, oil, or mercury. If the hand be dipped into water the temperature of which is identical with that of the skin, no sensation is perceived in the submerged part, though the pressure must be considerable, nor does any sensation accompany the dipping of the hand or foot into warm mercury; yet the pressure here exerted must be and is immeasurably superior to that which is required to produce the sense of contact. In both instances, however, a distinct feeling of constriction or of the application of a ring is experienced at the level of the fluid. A similar sensation is felt also if a globule of mercury, providing it is not too minute, is allowed to rest on the hand.

The explanation of these phenomena offered by Meissner is not very intelligibly worded, but appears to be essentially as follows:—He conceives that vibrations excited by the contact of fluid bodies extending through the cutis, propagate themselves at right-angles to the tactile extremities of the nerves, but when excited by the pressure of solids they are propagated so as to impinge vertically upon them, in each case giving rise to peculiar sensations; and he points out that this is essentially due to the circumstance that a solid body can only touch the surface of the ridges and elevations of the skin, whilst fluids penetrate into the valleculæ and depressions between them. The direction in which the pressure is applied to the skin and subjacent nerves in the two cases is therefore different, and it is to the uniformity of the pressure applied to the sensory corpuscles that we are to attribute the absence of sensation in submerged parts, whilst it is to the inequality of pressure at the level of the fluid—the papillæ experiencing the upward pressure of the fluid in their lower surface, and only the downward pressure of the air in their superior aspect—that the sensation of a ring at that point is due. Even a current of air acting perpendicularly upon the skin produces, according to Meissner, no sensation of contact, though, if it be directed obliquely to its surface, a sensation similar to that caused by contact with fine wool is perceived. Meissner has made a somewhat similar series of experiments with solid substances moulded so as to form an exact impression of the most delicate markings of the skin. Such a substance is found in paraffin, which may be poured, whilst warm, over the hand or finger. Here, again, when the paraffin had hardened, no sensation of contact was perceived, because the pressure was everywhere uniform, and when pressure was made it appeared to excite a sensation in the neighbouring articulations rather than in the part immediately touched.

Another circumstance showing the identity of the law of excitation of the nerves of touch with those of motor endowments is the fact that no impression is produced unless the alteration in the condition of the sentient extremities of the nerves is effected with a certain degree of rapidity. For if the hand be plunged into moderately warm water and after the lapse of a few minutes the temperature be very gradually raised 10° to 15°, no impression is excited. As regards the perception of temperature, Fick observes that, with a few exceptional cases, there is a constant current or efflux of heat from the deeper parts of the skin to the more superficial. So long as this passage is constant and invariable, no sensation of temperature is occasioned, whether the actual amount be high or low. But the constancy of the current may be interfered with in four distinct modes.

1. The conditions for the development of heat in the part, proceeding partly from local changes, and partly from the instreaming current of blood, may be more favourable; or, 2, the conditions for the reduction of temperature may be unfavourable; or, 3, the conditions for the influx of heat may be unfavourable; whilst, lastly, 4, those for its efflux may be favourable. In the first two instances a sensation of warmth is perceived, in the last two, of cold. Each of these four conditions is of more or less frequent daily occurrence. In blushing, for instance, we have a sensation of warmth in the cheeks, because more blood is traversing the vessels, and consequently more heat is conveyed to the part. So in passing from a cold room to a warmer one, a sensation of warmth is experienced, because the conditions for the radiation and discharge of heat are rendered more unfavourable. The third

case is less evident, but we may attribute to it those local sensations of deadness and numbness of the extremities which are seen in persons with slow and feeble circulation in cold weather. The fourth case may be exemplified in the sensation of cold which is experienced when the hand which has been exposed to the air at a temperature say of 50° is suddenly immersed in water of 52°, for the water being a better conductor of heat than the air, feels colder, although actually warmer. Several of the preceding points are shown in the following experiment made by Weber:—If, says this writer, I dip my hand for a minute in water of a temperature of 54° Fahr., and then in water of 65° F., a sensation of warmth first occurs lasting for a few seconds, and then giving place to a feeling of cold, which is permanent as long as the hand remains immersed in the water of higher temperature. Fick explains this by observing that the effect of the immersion in the cold water for a minute is to lower considerably the temperature of the skin, which again rises on dipping the hand into the warmer water, partly because the conditions for the efflux of heat are rendered more unfavourable, and partly also because the conditions for the influx of heat are more favourable, for evidently the vessels contracted by immersion in the colder fluid begin to dilate and admit a freer current in that of warmer temperature. The feeling of cold which subsequently arises, though the hand is still retained in the warmer fluid, is probably due to the circumstance that the supply of blood, which in the first few moments of immersion rapidly and greatly increases, again gradually diminishes.

The strength of an impression of heat or cold upon our minds—in other words, the degree of heat we believe to be present in any case—is dependent upon the extent and suddenness of the change induced in the sentient extremities of our nerves. When this is rapid in either direction, we assume a considerable difference of temperature to be present, and it is this that occasions the erroneous conclusion at which we sometimes arrive; for the rapidity with which a body causes the temperature of the skin to fall is dependent not only upon its relative temperature, but evidently also upon the capacity it possesses for rapidly conducting heat. Experiments made for the purpose of scientifically determining the sensibility of different regions of the skin, or the absolute amount of heat, are found to be usually, from various circumstances, unsatisfactory in their results. Weber and Fechner found that if the fingers of the same hand were immersed in water of different temperatures, the determination of the amount of difference was difficult. More correct results were obtained when the same fingers of the opposite hand were employed; but the most accurate judgments were made when the same finger was dipped alternately from one vessel into the other. By this means Weber could distinguish a difference of temperature of one-half to one-third of a degree Fah. between 60° and 100° Fah. Fechner also observed that extremely minute differences in temperature were accurately appreciated between 54° Fah. and 77° Fah.—differences so small that they could scarcely be recognised by the thermometer. Above and below these points, and especially below, the sensibility rapidly diminished, a greater difference in the temperature being required in order that it should be accurately perceived. Moreover, as regards the sensitiveness of different parts of the skin, two conditions appear to exert an influence—first, that in some places there may be a greater number of the sentient extremities of the nerves than in others, whilst these may also be endowed with a keener sensibility; or secondly, there may be a thicker epidermis, which may interfere with the rapid perception of temperature. This is well shown in the experiment of Weber, where it appears that if the whole hand be dipped into very cold water the first impression is most strongly perceived on the dorsum, obviously on account of the thinness of the epidermis, but subsequently in the palmar surface, because there the nerves are most abundant. The greatest sensibility for temperature exists, according to Weber, in the skin of the face, and especially in the cheeks, eyelids, and in the tip of the tongue, and to a somewhat lower degree in the lips. It is dull in the interior of the nose, but very acute in the external auditory meatus.

The number of sentient extremities of the nerves acted on in any part exerts considerable influence on our estimation of temperature; thus, when the whole hand is dipped in water it is conceived to be much warmer or colder, as the case may be, than when only a finger is dipped into it.

Weber has very clearly shown that the amount of heat or cold which occasions pain is identical with that which begins to affect injuriously the conducting power of the nervous tissues. A temperature of 120° Fah. does this, and is always productive of pain; the degree of cold is less accurately defined, but even a temperature of 50° to 54° Fah., if it act over a large extent of surface, and for some time, produces pain. Both with very hot and very cold water the introduction of the hand first produces a lively sensation, which gradually diminishes, and then rapidly increases till severe pain is experienced. Other sensations accompany the act in both cases: in the case of hot water there is a feeling of fulness and tension, while with both hot and cold there are trembling and inquietude, dependent partly, no doubt, upon convulsion of some of the muscles and on the pulsation of the vessels.

Weber found that, on dipping the finger into water at a temperature of 127° or 128°, it could be retained for 23 secs. before the impression of pain became so acute as to necessitate its withdrawal, in water of a temperature of 149° only 3 secs.; at lower temperatures a difference of 2° Fah. made considerable alteration in the length of time that elapsed before the pain became too acute to be borne.

He also investigated the effect of contact with metal plates artificially lowered in temperature, and found considerable variations in the sensibility of different parts. Thus, a plate having a temperature of about 26° Fah. produced no disagreeable sensation in the middle of the forehead, but when applied over the supra-orbital nerve it caused great pain. The extent of skin affected is also of much importance: a finger can be retained in water which is unbearable when the whole hand is plunged into it.

With low grades of pain produced by heat or cold we are still able to distinguish which of the two agents is in operation. Fick observes, that it is not probable that both the pain and the sensation of heat or cold are conveyed by the same nerve-fibres, but thinks that whilst some of the nerves of touch are so powerfully acted on as to occasion pain, others are only excited sufficiently to enable us to recognise the agent; and further, that whilst the pain has for its proximate cause a molecular change in the nervous substance itself, effected by the reduction or elevation of its temperature, the excitation of the sense of cold or heat is occasioned by changes of pressure in the terminal corpuscles. On this principle he accounts for the fact that nerves which have been powerfully excited by heat or cold lose for a time their capacity of conveying sensory impressions from the periphery towards the brain.

Upon the whole, then, our capability of distinguishing variations of temperature appears to be especially dependent—1, upon the rapidity with which the alteration takes place; 2, upon the temperature of the skin itself; 3, upon the extent of the surface of the skin which is subjected to the action of the agent; and lastly, upon the particular part of the skin affected.

Czermak caused one of the points of a pair of compasses, which had previously been approximated so closely as to give only a single impression, to be heated, whilst the other was cooled; when these were simultaneously applied, a simultaneous double sensation of heat and cold was distinctly perceived, but they appeared to be in the same spot, it being impossible to determine which was on the right or left, above or below the other.

That electricity is a powerful excitor of the sensory nerves, whether applied in the statical or dynamical condition, is well known. The laws which regulate the action of current electricity on sensory nerves appear to be identical with those laid down by Pflüger for motor nerves, though it is a remarkable circumstance that a current of a certain strength should act so much more energetically upon motor than on sensory fibres, whilst the opposite holds for the majority of stimuli. This may be well shown by the simple experiment of immersing the elbow in ice or cold water, when pain is quickly excited in the ulnar nerve and the region to which it is distributed, but no convulsions are observed to occur. On the contrary, by passing a weak current through the ulnar nerve at the elbow, contractions may be obtained in some of the muscles supplied by it, without any sensation of pain being experienced. Suslowa applied the current of two of Bunsen's cells to the skin, in the direction of the long axis of the forearm, and determined the sensibility in the neighbourhood of both poles. He found that, with all degrees of strength of the current, and in whichever direction it was passed—centripetally or centrifugally—the acuteness of perception for pressure, for distance, and for variations of temperature, was in every instance exalted in the parts surrounding the negative pole, and depressed in those around the positive pole. Induction currents so weak that they produced no sensation caused the feeling of tickling with a hair to disappear in the intrapolar region. The opening and closure of a current derived from four pairs of plates are sufficient to produce pain, and this occurs even during the closure; where an increased number of plates are introduced the pain is augmented, and this is probably attributable to a process of electrolysis taking place in the nerves. It is remarkable that the pain is most severe at the point where the negative pole is applied.

According to Mr. Lobb, some parts of the skin are much more acutely sensitive to electrical stimuli than others, thus, when one of Pulvermacher's bath batteries of moderate strength was applied to the palm of the hand, or sole of the foot, or to the side of the digits, no painful impression was perceived, but on applying it to the hairy and polygonally reticulated skin which exists on the back of the fingers and hand, a burning sensation is experienced, which rapidly becomes unbearable. The effects produced by static electricity, or by interrupted currents, closely resemble those of shock, and if sufficiently strong may destroy the organization of the nerve.

Dubois-Reymond has remarked, that if two metal plates of different sizes are charged with the same amount of electricity the most painful shock is always received from the smaller plate, though, if the plate be charged in proportion to its size, as one spark for one square inch, six sparks for six square inches, and so on, the more painful shock is always obtained from the larger plate. With small plates the pain is sharp and acute, with large ones dull and heavy; and Cavendish long ago showed that a disk charged with electricity the quantity of which might be represented by 1, and the tension by 1, produced a less painful shock than one in which the quantity of electricity present was 2 and the tension $\frac{1}{2}$. The physiological stimulus, therefore, increases more quickly with the amount than with the tension of statical electricity. We have no space to enter upon what might otherwise prove an interesting subject, the relation of the cutaneous sensibility to disease. The reader will find an interesting paper on this subject, so far as relates to the insane, in the 'Journal for Psychological Medicine, for 1860,' by M. Auzony, by whom it is shown that, amongst such patients analgesia to a greater or less extent is exceedingly common. Wundt, again, found the sense of space always blunted in paralysed limbs, the limits of confusion being diminished, and variations occurring in correspondence with the varying conditions of the patient. In meningitic affections of the spinal cord, accompanied with hyperæsthesia, it was found that local depletion reduced the sensibility of the skin immediately, whilst the loss of motor power and other symptoms often remained unchanged. The fact that a stronger impression will often extinguish, or render imperceptible, a weaker one made at the same time, is often better shown in pathological than in normal conditions. In diseases accompanied by anæsthesia, when any opinion at all can be expressed by the patient, it is remarkable that not only is the nature of the stimulus frequently stated incorrectly, but also the part to which it is applied is very inaccurately recognised, whilst the time and duration of the impression are equally imperfectly perceived.

REVIEW IX.

1. *Eighteenth Report of the Commissioners in Lunacy to the Lord Chancellor, ordered by the House of Commons to be printed, June* 14*th*, 1864.
2. *Sixth Annual Report of the General Board of Commissioners in Lunacy for Scotland. Presented to both Houses of Parliament by Command of Her Majesty.—Edinburgh*, 1864.
3. *Thirteenth Report on the District, Criminal, and Private Lunatic Asylums in Ireland; with Appendices. Presented to both Houses of Parliament by Command of Her Majesty.—Dublin*, 1864.

THESE "blue-books" present us with the official aspect of insanity as existing in the United Kingdom; and as the information they contain is necessarily more complete and reliable than any that could be procured by private means, they become documents of considerable interest and importance. The reader cannot fail, on glancing at the titles of the Reports enumerated above, to be struck with the unequal operations of the law in the three countries, as suggested by the present year calling forth from one the 18th, from another the 6th, and from a third the 13th official Report. United as the three countries have been so thoroughly, and for so long a period, it seems strange that in a matter of internal economy, not a question of party politics, and involving great public interests, so valuable a reform as the Lunacy Acts inaugurated should have been introduced piecemeal, and left to find its way into each division of Great Britain at uncertain intervals. Yet so it is, for in England and Wales a Commission began its labours in 1844; in 1845 the Inspectors of Asylums were appointed in Ireland, and only six years ago did the Scotch Commissioners make their first Report. Nor are the legislative enactments in a less anomalous condition as regards the three countries. Be this, however, as it may, the system seems to work well, and the official Reports testify yearly to the improved and improving condition of the insane throughout the kingdom. Each Report bears on its pages the traces of its nationality, and the spirit of diversity affects even the official details as much as the style of composition, while, to afford a still further variety, the Inspectors and Commissioners each address their remarks to a different authority—the English to the Lord Chancellor, the Scotch to the Home Secretary, and the Irish to the Lord Lieutenant. The English Report, though the most bulky, and dealing with the largest amount of material, hardly equals the Scotch in solid matter, nor is it written with the same minuteness that distinguish both the Scotch and Irish. The labour devoted to the compilation proceeding from the northern metropolis, indeed, quite throws into the shade the efforts of the sister office in Whitehall; but we almost question the utility of the very elaborate statistics contained in the appendices, for the readers who have the courage to undertake their study must be rather few in number.

The one complaint in which the three kingdoms combine to lift up their voices is the inadequate accommodation for the existing number of insane poor; and in England we find that, despite the vast sums expended in building during the last few years, the following asylums are nearly or quite full—Bucks, Devon, Rainhill, Leicester, Abergavenny, Oxford, Salop, Suffolk, North and East Riding, Bristol, Colney Hatch, Hanwell, and the Three Counties' (the last three only as regards females); that is, about one-third of the whole number of the public establishments. So great are the differences in the methods of considering the insane in the three Reports that we cannot even discover the numbers recognised by the authorities on the same day, for while the English statistics are reckoned up to the 1st of January, 1864, and the Irish till December 31st, 1863, the Scotch refer only to January 1st, 1863; and, though giving in sundry tables the admissions and discharges during the year, indulge in no intelligible summary. The total number of the insane included in the official returns from public and private establishments on January 1st, 1864, was as follows in the three countries:

IN ENGLAND—	
In County and Borough Asylums	21,551
„ Hospitals	2279
„ Licensed Houses	4455
Total	28,285
IN SCOTLAND—(approximately)	
In Public Asylums	2910
„ Private „	874
„ Poorhouses	897
„ Private Dwellings	1679
Total	6360
IN IRELAND—	
In Public Asylums	4745
„ Private „	556
„ Criminal „	127
„ Jails	389
„ Poorhouses	2455
Total	8272

We propose now to take each Report separately, noticing the principal points of interest it presents.

England.—First, as regards numbers, we are given to understand that not only have these increased vastly of late, but that a still further increase is to be looked for. Thus, in reviewing the statistics for the last fifteen years, it appears that, whereas on the 1st January, 1849, our asylums contained 14,560 patients, on the same day in 1864 the inmates numbered 28,285, or nearly double the amount.

"On taking a summary view of them, it will be seen that about 5000 patients have been added during each period of five years, or 1000 annually. In the first and second terms of five years the addition did not reach 5000, but in the last it was greater, an advance having taken place from 22,852 to 28,285, being an increase of no less than 5433. A glance at these figures renders obvious an important fact, deserving serious consideration—namely, that we have to deal, not only with a *progressively increasing number of resident inmates of asylums, but also with a great advance in the number for whom admission is sought*. This increase is confined almost entirely to the pauper class, and was anticipated."

It appears, however, that the numbers we have given above by no means include all the insane, for the Commissioners state that—

"in addition to the 28,285 patients resident in asylums, we have also, to some extent, under our supervision, those in workhouses, and others living at home, or lodged out as boarders. The latter class, embracing all not in asylums, now amount to 16,410. We are concerned, therefore, more or less, in the welfare of *forty-four thousand six hundred and ninety-five* persons of unsound or defective intellect. Large as this number appears, we are yet aware that it does not fully represent the amount of insanity existing in the country. The insane in jails, and the Chancery patients living out of asylums, are not included; and many cases being still kept out of view, for private or other reasons, escape altogether official inspection and registration."

The statistics of fifteen years clearly establish certain facts as to the relative degree in which the sexes are affected, more men being *admitted* than women, while more women are *discharged*, both recovered and relieved, than men. The mortality, too, is much greater in the male than in the female sex.

The chief event of the past year was the opening of the long-promised "Criminal Asylum," which on January 1st, 1864, contained ninety-five females.[1] This building is situated at Broadmoor, where a space of nearly 300 acres has been cleared for the abode of this peculiar section of the mad world, and money has been expended without stint to render it worthy of its state parentage. The most pressing question, however, is as to the future occupants, for, while Broadmoor can accommodate only 500, there were at the beginning of the year not less than 924 of these so-called "criminal lunatics!" A more unfortunate misnomer could hardly be conceived. The Commissioners, fully alive to the "impropriety and absurdity of treating a large number of the patients confined under the Secretary of State's warrants as of the criminal class, or otherwise than as ordinary lunatics," suggest that "the Secretary of State should be empowered (which he is not at present) to transfer such patients from the criminal to the ordinary pauper class," and hope that the government will undertake the revision and consolidation of the Acts relating to the subject, a step which appears "to be urgently called for." In Ireland there has been a criminal asylum in operation for the last fourteen years, that country having set the example in this as in many other forms of lunacy improvement. In 1846 an order in council was passed for its construction at Dundrum, near Dublin, on a site comprising around it twenty-nine

[1] It is now inhabited by both sexes.

acres of land, and it was placed virtually under the sole control and management of the Inspectors, who regulated the admissions by selecting, in the first place, those convicted of homicide or serious crimes, while they considered those who had committed much simpler offences, but who had shown themselves of violent disposition, dangerous, or ungovernable, equally fit subjects for admission. With a fourteen years' experiment to guide them, it is hard if the English authorities do not make their establishment a model, particularly as they have had enormous sums of money at their command for the purpose.

The celebrated Flushing case is of course detailed at considerable length, and is perhaps the most interesting incident in the annual chapter of accidents.

Scotland.—We have already given in the form of a table the number of insane recognised by the Board of Lunacy, but in this are not included about 1900 lunatics maintained from private resources, and not under official control. The distribution of the insane is modified by circumstances peculiar to the country and people, the most prominent being the devices to lessen the expenses incurred by sending patients to the public asylums. In reviewing the statistics we are met at the outset by the curious fact that there has been for the last two years no increase in pauper lunacy in Scotland, though in England the reverse has been the case; but in reference to this point the Commissioners remark:

> "We do not regard the falling off in the numbers of pauper lunatics as absolute proof that there is a decrease in the occurrence of lunacy among the indigent classes, for the cause may possibly lie in the *omission of inspectors of poor to make correct statutory returns.* We speak from experience when we state that there is a disinclination among inspectors of poor to report to us cases of lunacy which do not appear to them to involve the necessity for asylum treatment. Hence many persons affected with idiocy or dementia are treated as ordinary paupers, and are not accordingly brought under our cognizance."

We have no doubt of the truth of this explanation, but it seems rather odd that this miserable parsimony on the part of the parish officials should have been pursued to so great an extent unchecked, and under these circumstances we quite agree that "some time must necessarily elapse before the average growth of pauper lunacy can be correctly ascertained." The proportion of lunatics to the population is shown to be in Scotland, 38·5 to every 100,000 inhabitants, but the ratio varies in different districts, according to the amount of pauperism, habits of the people, whether agricultural or manufacturing, and so forth. As in England, so in Scotland, the female pauper lunatics outnumber the male, and this is owing not so much to any greater proclivity in the sex to insanity as to the larger source from which the supply is derived, for while the males are to the females in the whole population as 100 to 111, the male *registered paupers* are to the female in the proportion of 100 to 288·8, and the male pauper lunatics to the female as 100 to 118·6.

The private are, it appears, not more than a third of the number of the pauper patients, a fact attributable chiefly to their gradual removal from asylums to private dwellings when incurable; and this suggests to the Commissioners "the idea that possibly an equal proportion of pauper patients might, under judicious arrangements, and with adequate parochial allowances, be accommodated in a similar manner, and a stop be thus put to the *indefinite extension of asylums.*" They go on to point out very clearly the evils of large and overgrown establishments, and of detaining in them patients "almost as a matter of course, after their maladies have assumed a chronic form, and no danger is to be apprehended for themselves or others," showing how the association of so many demented must exercise an injurious influence on the rest of the patients, and the difficulties the superintendents must have in dealing with such patients individually, in effectually supervising them and their attendants. If proof were wanting on this point, it is abundantly supplied by the fact that last year two cases of pregnancy occurred at the Royal Edinburgh Asylum, as well as a death from extensive injury of the chest, only discovered post-mortem, to say nothing of numerous minor accidents at other establishments, only revealed accidentally to the Commissioners. A large number of chronic cases are now boarded out in the poorer districts of the north, with the sanction of the authorities, at a third of the cost in the asylums, and this plan, if adopted with some restrictions to provide for the well-being of the patient, would go far to relieve the present difficulties existing in this country, difficulties too for which hardly any other remedy is proposed than the "indefinite extension of asylums." Perhaps we could not better exemplify the diversity which affects the views of lunacy in the north and south of this island, than by the announcement that there are only 32 criminal lunatics in Scotland, while there are 924 in England! This term is restricted in the north to those confined in the lunatic wards of the general prison, or those sent to ordinary asylums under sentence of a court of law, or by the Secretary of State, and the numbers are kept low by the fact that patients lose the unenviable distinction when removed from the lunatic wards of the central prison to ordinary asylums.

We must not omit to notice the Report by Dr. Paterson, one of the deputy-commissioners, on the single patients visited by him in the north-western counties. He found that in the Highlands the proportion of insane paupers to the population is greater than in the Lowlands, being about one in 400 in the former to one in 750 in the latter, while in one parish, Kintail, there were not less than twelve in a population of 900. Another striking peculiarity is that in the Hebrides the male lunatics exceed the females in the ratio of 32 to 26, and this has been attributed by Dr. Mitchell to the preponderance of congenital over acquired insanity. Dr. Paterson adds:

"In visiting certain of these islands, it is impossible not to have been struck by the great prevalence among the insane of examples of idiocy of the lowest types, and there seems good reason for believing that the more backward a population is in point of social progress and material well-being, the greater will be the prevalence among it of forms of idiocy of the lowest type."

Ireland.—In its provision for the insane, Ireland may be said to have long forestalled the tardy philanthropy of its more fortunate sister country, and so far back as 1831 the Inspectors General of Ireland in their Parliamentary Report remarked: "It is quite gratifying to visit these provincial asylums for the lunatic poor, where they are fed, clothed, employed, and *frequently cured* (!); and such moral treatment, characterized chiefly by humanity, constant intercourse and inspection, cleanliness and employment, as to fully equal, if not surpass, anything of the kind in Europe."

Dr. Conolly, too, many years ago, it is true, was of opinion that "both continental and Irish asylums are better managed than those of England," a superiority not very difficult to achieve at that time, when the Inspectors could complain that at Haverford West there were only "a man and his wife, who had *twenty pounds a year between them*, and were required to take charge of eighteen unruly patients without a single servant or assistant."

The first public receptacle for the insane of which there is any mention seems to have been the six lunatic cells attached to the Dublin Foundling Hospital in the year 1732; but these were superseded not long after by the erection of St. Patrick's, or as it is better known, Swift's Hospital, which was opened in 1757 for fifty patients. Dean Swift bequeathed 12,000*l.* for the benefit of as many idiots and lunatics as the income would support, and this sum was added to by voluntary contributions and parliamentary grants, in order to increase the benefits of the charity. The next step in the history of Irish lunacy was the erection of the Richmond Asylum, which was built and furnished by Government, at a cost of 75,000*l.*, to serve as a general hospital for the insane, and to be supported by parliamentary grants; but this was of course soon found to be insufficient.

In 1817 a Committee of the House of Commons was formed, to consider the question of providing for the lunatic poor, as, with the exception of the Richmond and a house at Cork, there was not accommodation for more than 130 lunatics throughout all Ireland; and this Committee reported that the only effectual way of relief would be to divide the country into districts, each of which should be provided with an asylum. This was the origin of the "District Asylums," nine of which were projected as probably sufficient for the wants of the country, containing 980 beds, and at a cost of 209,085*l.* In the course of a few years, however, the numbers had increased so much that these buildings were altered, so as to hold 1930 inmates. The first one opened was the Armagh, in 1825; succeeded by the Limerick, in 1826; Belfast and Londonderry, in 1829; Carlow, in 1831; Ballinasloe and Marlborough, in 1833; Clonmel and Waterford, in 1835. These constituted the original district asylums, and were followed by others: at Kilkenny, Cork, and Killarney, opened in 1852; at Armagh, in 1853; and Sligo, in 1855. The steady increase of patients is proved by the following figures:—In 1844 the returns showed that there were 4638 in confinement, besides 6217 at large, under care of friends or otherwise, being at the rate of 1 in 753 of the whole population; while in 1851 the numbers had risen to 15,000, of whom 8895 were not in confinement; and in 1863, besides the 8272 in asylums, poor-houses, &c., there were reported 8384 at large, making a total of 16,256. These numbers show no diminution in the proportion of insane, for during the last four years the population has undergone a marked decrease, and the Inspectors explain the fact in this way:

> "On inquiring throughout the provinces, which on official inspection it is our duty to frequently traverse, we hear that not only are the infirm in mind and body left at home by their emigrant friends, but that the insane, the epileptic, and debilitated, are often sent back to their native country from America, as being ill-calculated for social employment or military duties."

During the past year an auxiliary asylum has been opened at Clonmel, for 147 patients, and six new asylums are in progress in various parts of the country, but still further room is wanted, particularly in the metropolitan districts of Wicklow, Louth, and Dublin. In order to meet the accumulation of chronic cases, the Inspectors favour the plan of making use of the poorhouses; and state their views as follows:

> "Taking into full and mature deliberation the whole subject as to how the surplus of the chronic, epileptic, and idiotic classes not placed in asylums, and more whose habits and dispositions render them innoxious, should be supported, and where located; regarding, too, the rapidly decreasing population of this country, the heaviness of local taxation, and the comparatively empty state of the poorhouses, which at the close of 1863 contained 52,000 inmates, against 144,000 ten years previously, it may not be unworthy your Excellency's consideration to determine whether in each county, according to its size, two or three poorhouses might not be selected in suitable localities for the reception of such individuals as have just been mentioned."

The most striking, however, and the peculiar feature of the disposition of the insane in Ireland is the custom of sending so many to *jail* for safe custody, as "dangerous lunatics." Thus, irrespective of the criminal lunatics, there were not less than 389 at the end of 1863 in jails, absolutely a larger number than there were twenty years ago, when asylum accommodation was about half what it now is, and when the population was eight instead of, as now, five and a half millions. "This fact," the Inspectors remark, "tends to prove the increased freedom exercised in sending lunatics to prison on the one hand, and on the other a *very liberal* notion among justices and medical practitioners as to the dangerous phases of mental derangement." The Act which gives magistrates this power (passed in consequence of a gentleman of high position being killed in the streets of Dublin by a madman, for whom there was no room in the asylum), is not in itself objectionable, but these gentlemen seem to make use of it without due caution or inquiry, so much so that "on the most trivial grounds, individuals very far advanced in life, *from seventy to eighty years of age, palsied and infirm*, whether actually of disordered mind, or imbecile and epileptic, are likely to be manufactured into dangerous lunatics, through the instrumentality of their relatives, or of officials anxious to get rid of their charge in the shortest possible mode." The number of committals to jails averages from 500 to 600 yearly, and the Inspectors have used every endeavour to lessen the evil, and in some districts with good results; but till there is sufficient accommodation throughout the country, it seems useless to attempt any fresh legislation on the subject.

The private licensed houses are not very numerous in Ireland, only seventeen, but are favourably reported of. There are also three institutions, established on charitable foundations, in which payments are received for a portion of the inmates—viz., Swift's Hospital, the Retreat, near Donnybrook, belonging to the Quakers, and the Richmond Retreat, under the religious sisterhood of St. Vincent de Paul.

As regards the statistics there are some points of special interest, to which we would draw attention. The mortality is stated to be "invariably less in Irish asylums than in any other like institutions; 9 per cent. per annum may be considered on an average the proportion which generally obtains, as against 7·26 in the district asylums." The recoveries were on the admissions at the rate of 44½ per cent., and the total relapses for the past year did not exceed an eighth of the total admitted. But the most curious point is the preponderance of the single over the married, the "*unmarried in the Irish asylums being three times as numerous as the married*, while in England the very reverse obtains." The Inspectors, while not surprised at the disproportion in Ireland, are at a loss to understand "why in England, with twenty millions of inhabitants, and *a third of the whole married*, there should be in the two social states so marked a disproportion of mental disease. In France a more equable relationship is maintained, the insane single exceeding by about eighteen per cent. the married lunatics." We would lastly refer to the remarkable degree in which an hereditary tendency to insanity is said to exist in certain districts, notably those of Londonderry and Waterford. In the former it is found particularly among those "from the mountain ranges of Donegal, where hitherto, from want of general means of communication, and more clannish habits, intermarriages may have been more prevalent. Enumerated among the more immediate degrees of relationship are three brothers, two sisters, a brother and sister, two first cousins, &c.," while in the Waterford asylum, "in a community of 146, there are two brothers and eleven first cousins, a mother and daughter, and two sisters, all insane, and, as appears, in the closest consanguinity."

The evidence contained in these several reports assures us of the satisfactory condition of the asylums under inspection, and there is no doubt that official pressure has done much towards effecting sorely needed improvements. Yet this has its drawbacks, and some of the evil results of this lunatic censorship are now becoming apparent. The struggles maintained so long between asylum authorities, public more than private, and commissioners, have become less and less; we miss from the annual reports the amusing passages of arms that indicated the existence of some energy and will besides that emanating from Whitehall Place; and superintendents, apparently feeling that it is hard to kick against the pricks, have subsided into becoming submission. Nay, even the officials seem to feel the dulness of being left merely to find fault, and complain that the Hanwell Committee has not "answered" their last diatribe! Absence of opposition, so far from being a sign of political health, is only an indication of diminished vitality, and it would be well for those who are so ready to rejoice in the triumphs of the Commissioners to remember the warning which one of the ablest thinkers of the day, Mr. J. S. Mill, has given, that a—

> "State which dwarfs its men in order that they may be more docile instruments in its hands, *even for beneficial purposes*, will find, that with small men no great things can really be accomplished; and that the perfection of machinery, to which it has sacrificed everything, will in the end avail it nothing, for want of the vital power which in order that the machine might work more smoothly it has preferred to banish."

REVIEW X.

Guy's Hospital Reports. Edited by S. WILKS, M.D. Third Series. Vol. X.—*London*, 1864, pp. 400.

THE present volume of these old-established records of clinical observation is more bulky than usual from being supplemented by an index to the ten volumes issued between 1855 and 1864. This most useful appendix has been prepared by the indefatigable editor, Dr. S. Wilks, and will be duly appreciated by every possessor of the several volumes referred to in it. The essays in the present part are mostly of high practical importance, and are illustrated by fourteen well-executed plates.

The first paper will be much valued by the students of midwifery statistics. It is the fourth Report of the Guy's Hospital Lying-in Charity, and presents a summary of all the cases attended during the past nine years. Dr. Braxton Hicks, who has prepared it, has departed from the plan of similar preceding records, by omitting "the table of the number of monthly and yearly deliveries, as possessing no practical use nor accurate basis for computation." On the other hand, he has given the cases in more detail than heretofore, a proceeding which will afford a higher degree of accuracy to statistical conclusions deducible from them.

The histories given are of cases occurring in outdoor practice. The total number of women attended was 14,871; that of children born, 14,999, of whom 95·6 were born alive. "In 14,962, of whom the sex is mentioned, 7825 were males, 7137 were females, or as 100 to 91. Of the children born alive, the males constituted 52 per cent.; whilst of 587 still-born, the males were 349, or 59·4 per cent.

Hence the proportion of males to females, still-born, was greater than the ratio of males to females born alive. In other words, there is a greater relative loss of male infants in parturition, due, apparently, as Table II. (p. 4) shows, to the greater prevalence of "podalic and pelvic presentations."

Attention is called "with some satisfaction," to the death-rate of the mothers, being only rather more than 2¾, (2·94) per thousand, or 1 in 340, from all causes, instead of 1 in 140, as happened in the twenty-one preceding years.

"This improved rate is much owing to the diminution of puerperal fever, particularly of the toxæmic varieties. In the present report we have less than one case in 1000, while in twenty-one years' report it was one in 234 cases." This low rate of maternal mortality is advanced as affording "satisfactory evidence of the advantage of home attendance over that of lying-in hospitals. . . In no instance has so-called puerperal fever been carried to any other patient. The rule of the charity requires the attendant to restrict himself to any case where it is suspected that any form of such complaint is present," and no student who is dissecting, or engaged in the post-mortem inspection room, is allowed to attend cases.

The cases recorded are arranged under different heads, indicating the abnormal presentation or other condition of departure from natural delivery. Some of them are given in considerable detail and the operative proceedings indicated.

As it was, peritonitis and pyæmia produced rather more than half the deaths, while hæmorrhage, from various causes, caused a fourth. Two instances of cæsarean section occurred, but in both the child was already dead when extracted. There were eighteen cases of eclampsia, of which five died, two of them undelivered. Rupture of the uterus occurred in three instances, besides the two where it happened during the operation of craniotomy. In every case it happened in vertex presentations.

In the second paper of the present volume, Mr. Bader describes the "Treatment of Granular Conjunctivitis by Inoculation with Pus." At Guy's and at the Ophthalmic Hospital, Moorfields, about 157 cases (240 eyes) were treated by inoculation, between October 1857 and March 1864. The disease was in some cases accompanied by pannus, in others not; where it existed severely, it seemed necessary to obtain abundant suppuration.

"All cases (writes Mr. Bader, p. 63) of granular conjunctivitis can be cured by inoculation; but if the entire, or part of the cornea, be transparent, the difficulty arises of producing such a suppuration as will destroy the granulations without leading to destruction or perforation of the cornea."

The cases treated by inoculation are arranged by Mr. Bader in groups, according to the particular lesions and complications present. The mode of inoculation, the precautions to be observed, the symptoms developed, and the treatment of the inoculated eye, are clearly described, and an excellent plan is suggested for recording the history of cases, the treatment followed, and the results.

The operative proceeding in question was, it seems, first practised in the Austrian army about 1812; but the frequency of unsatisfactory results was opposed to its general adoption. The failures were mostly due to an imperfect acquaintance with the necessary conditions and mode of operation, but with the present amount of knowledge, to which Mr. Bader has so meritoriously contributed, failures will doubtless prove rare exceptions in properly selected cases.

The subject of the third paper is "The Medical Preparations of Arsenic," and is from the pen of Dr. Habershon. It is a useful brief *résumé* of the generally recognised facts respecting the several preparations of arsenic, their uses, and the conditions of their administration. The writer has a predilection for the acid solution of arsenic, (the Liquor Arsenici Chloridi), particularly as it may often be advantageously combined with the preparations of iron; and he consequently regards its omission from the British Pharmacopœia as a mistake.

The same diligent physician records "Two Cases of Disease of the Supra-renal Capsules, with Bronzing of the Skin," and his commentary upon them insists strongly on the connexion of the lesion with the vaso-motor nerves. Although most cases detailed have terminated fatally, there are numerous closely allied conditions in which recovery takes place. "The sickness, exhaustion, compressible pulse, and failing power of the vital functions, are not peculiar to this disease of the supra-renal capsules; and even discoloration of a very similar kind is found in other maladies." Such a collection of symptoms is noted in the exhaustion from over-lactation, but as the cause is removable, the diseased state is therefore curable; whereas, when there is morbid deposit in the supra-renal capsules, there is a persistent cause of irritation of the vaso-motor nerves connected with those bodies, and of consequent exhaustion and death. In some instances, moreover, of syphilitic cachexia there are discoloration of skin and great exhaustion—remediable, however, by proper treatment.

Dr. Habershon adduces some special observations to show the intimate connexion between the supra-renal capsules and the vaso-motor nerves, especially of those derived from the semi-lunar ganglion, and presents a plate in illustration of it. "A branch of the pneumogastric nerve may also be traced to the supra-renal capsule, and the irritability of the stomach is probably due to this cause." Whatever be the function of those capsules, their peculiarly close connexion with the vaso-motor nerves suggests the desirability of always examining, in cases of supra-renal degeneration, the relations and condition of those nerve structures.

Mr. Bryant publishes a very good "Clinical Report on Inflammation and Tumours of the Breast, more particularly in reference to their diagnosis." The several morbid conditions are carefully considered, and several cases recorded, chiefly of cystic adenocele.

Mr. Joseph Towne has an interesting memoir detailing original experiments upon "The Stereoscope and Stereoscopic Results," in relation to vision. The present memoir is in continuation of a preceding one on the same matters, and the author combats in it the correctness of certain hypotheses advanced by Professor Wheatstone, especially the one that no necessary physiological connexion exists between corresponding points of the retinæ. His aim is to ascertain

> "whether the same reciprocity of action can be shown to exist between very minute portions of reciprocating parts of the retinæ; in other words . . . . . to offer a few observations connected with the theory of identical points. This theory assumes that an object is seen single because its pictures fall on corresponding points of the two retinæ, ... corresponding points of the two pictures falling on corresponding points of the two retinæ."

This learned and somewhat intricate, though very interesting disquisition, based on experimental inquiries, whereby Mr. Towne ably upholds and apparently successfully establishes the theory of a necessary physiological connexion between corresponding points of the retinæ, irrespectively of colour sensation, is illustrated by an excellent coloured plate, and forms a valuable contribution both to optical and to physiological science.

It is followed by the history of "A Case of Intestinal Obstruction, or modified Obturator Hernia," detailed by Mr. Cooper Forster, and accompanied by an engraving. Among other means resorted to with the hope of reducing the strangulated intestine, that of placing the patient in a warm bath and applying the cold douche to the abdomen, was tried, at Mr. Forster's suggestion, as he had proved it useful in two previous cases of constipation, where all other remedies had failed.

Dr. Hilton Fagge describes a "Case of Aneurysm seated on an Abnormal Main Artery of the Lower Limb;" the artery in question, "arising from the internal iliac running down the back of the thigh and terminating in the popliteal, as the main artery of the lower extremity." Besides the present one, only three other instances of this abnormal vessel appear on record. "The femoral artery itself was small, and terminated in a branch, apparently the superficial part of the anastomotica magna, which ran near the internal saphenous nerve." The abnormal artery passed through the greater sacro-sciatic foramen, was about the size of the femoral, and ran along the back of the leg parallel to the sciatic nerve. The opening of the vessel into its aneurysmal sac was situated in the interval between the tuber ischii, and the great trochanter.

"A Memoir of a Remarkable Case of Disease (a new growth) Affecting the Shaft of the Tibia," by John Birkett, well deserves the place it occupies in this volume. The patient, a female, broke her leg; it was treated in the ordinary way, but after the expiration of a month a tumour was noticed by the surgeon over the seat of the fracture, and then "for the first time, the patient stated that she had observed a swelling in that locality for about six months, which varied in size, and had not given her much pain." This history pointed to diseased bone. However, union of the fracture was completed in about six weeks, and she remained out of hospital for some nine months, when she was readmitted on account of the onset of much suffering in the tumour, which in the meanwhile had rather increased in size. It was now treated as an inflammatory tumour, and after a month's residence the patient returned home relieved. However, seven months afterwards she again sought re-admission, the pain having become agonizing. On now cutting into the tumour, Mr. Birkett had to divide a dense fibrous layer, and then exposed an opening into the tibia, having sharply defined edges. "Within the shaft of the bone, which was somewhat expanded, there was a soft vascular growth, easily excised, or rather scooped out." Under the microscope it appeared composed of oval, elongated, nucleated cells, with a considerable quantity of delicate fibre-tissue. Eventually the limb was removed, as the sufferings of the patient became aggravated, and the growth increased, like a large fungating mass. Constant vomiting, with pain and exhaustion, followed the operation; the upper flap became gangrenous, and the patient died. The soft parts of the limb surrounding the diseased tibia were found perfectly healthy, and not unusually adherent. The fibrillæ were quite healthy.

Dr. Alfred Taylor contributes three papers on subjects connected with medical jurisprudence, which will be duly appreciated, like other works of this able medical expert, by every student of that subject. His first communication is entitled "Cases and Observations in Medical Jurisprudence." The first four cases afford examples of poisoning by mercury. The first is a singular case of poisoning by mercury through the skin and lungs, with death after four years' exposure to the poison. The man was employed in packing the skins of animals that had been washed with an acid solution of mercury, and afterwards dried. The mineral was detected after death in the brain, liver and kidneys.

The fifth case is one of poisoning by tincture of aconite: in the eighth, nitrobenzole was the poison; and in the ninth, aniline. The concluding section is occupied with the process of detecting chloroform in the blood.

Dr. Taylor's second memoir treats of "A Case of Poisoning by Arsenic from External Application," which presents very important considerations in connexion with medical jurisprudence. The third paper is on "Death from Rupture of the Uterus, Inversion of the Uterus, and Expulsion of the Child by Gaseous Putrefaction," a singular case communicated to the reporter by two former pupils, Mr. E. Bedford and Mr. A. Roberts, occurring in the neighbourhood of Sydney. The patient, at thirty-seven, had died during labour with her seventh child, the child remaining undelivered. Reports arose as to want of care on the part of her first medical attendant, and, the body having in the mean time been buried, was exhumed for the purposes of an inquest. The body, on examination, was found "a good deal" advanced in decomposition, the abdomen in consequence much distended, and the dead and decomposed body of a male child, which had arrived at its full time, was lying between the thighs, the head towards the feet of the mother, and the feet underneath the uterus, which was inverted, and with the placenta attached to it, lying also between the thighs. The umbilical cord was not divided. On replacing the uterus, which was not contracted, a transverse rent, about six inches long, was found a little above its cervix; this rent also extended through the peritoneum, in the cavity of which four pints of effused blood were found. From the history and appearances, the opinion arrived at was that death resulted from rupture of the uterus, and that the consequent loss of blood was so sudden and copious that the first symptoms gave no clue to the coming event, and that no blame attached to the first medical attendant.

"There are many points of interest in this case. 1. The rupture took place after one prolonged pain, without any previous symptoms that would lead to a suspicion of what was about to happen. 2. Though the rupture was large, yet the body of the child did not escape into the abdomen—no doubt owing to the fact that the child had been brought down very low by the prolonged pain which nearly passed it into the world. Rupture of the uterus took place, and the child was too low down to recede to its original position. The child was not expelled from the mother by any post-mortem contraction of the uterus, for that organ was not found contracted. The post-mortem passage of the child and inversion of the uterus, were, I consider, the result of the pressure of the gas arising from decomposition in the abdomen, the uterus itself lying inactive. . . . . . The case is, so far as I am aware, quite novel, for I have nowhere seen recorded an instance of inversion of the uterus as a result of post-mortem changes."

Dr. Taylor appends two cases illustrative of rapid gaseous putrefaction, and gives another brief history of the expulsion of a child after death, by means of the gases generated in the abdomen by decomposition, as recorded by Richter, in 1861. In this instance, there was this further peculiarity, that labour had not commenced previously to death; however, the uterus was not lacerated nor inverted, as happened in Mr. Bedford's case. Dr. Taylor concludes with some pertinent remarks on the suspicions which might arise, and involve the good fame of a medical man, from the occurrence of a similar instance of post-mortem delivery, unless the whole facts were known and could be deposed to by an eye-witness; and, farther, be elucidated by the record of like cases.

"The Glandular Nature of Proliferous Disease of the Ovary," is the subject of an able essay by Dr. Braxton Hicks. Two years since the author was struck by the similarity of the microscopical appearances of "proliferous cysts of the ovary" and adenocele of the breast; and he now questions the propriety of retaining the group "proliferous cyst" at all, "at least in the manner hitherto used, and with its present members." The cystic position of the growth, whether of adenocele of the breast or of proliferous cyst disease of the ovary, "is rather the result of an accidental circumstance than of an essential condition. In other words, an adenocele may exist without any cysts whatever," the whole gland-mass being so firmly tied and bound by connective tissue, as to form a dense, solid tumour. In adenoma of the ovary, the true follicular nature is best shown when the fascial envelope is separated from the gland-like portion by serum. These follicles—

"are essentially distinct from the villous growths found in the mucous membrane of the bladder, and on the cervix uteri, or the mucous membrane of the intestines, &c. The true normal villus, and also the villus-like structures are essentially a loop of bloodvessels, with their capillaries running in the centre of the pedicle, and to these belong the villi of the chorion; but in the pedunculated growths in question the bloodvessels are on the exterior of the pedicle and lobules, covered by the epithelium only."

He differs from Dr. Wilson Fox in believing "the projecting so-called villous growth which springs from the cyst-wall is the true glandular structure, the interior of it lined with epithelium, representing the cavities of an ordinary follicle. In this it coincides with the mode of growth in adenocele." Again, "the dendritic growths are allied to the adenoid and proliferous varieties, varying perhaps rather in degree than in kind."

Dr. Hicks' general conclusion is that "all these growths (including piliferous and dentiferous cysts) spring from the wall of the Graafian follicles, and have their origin in an ovum, which, departing from its usual quiescent condition, is stimulated to grow after the manner of these dermic tissues in those piliferous and other like cysts. Dr. Hicks' paper aids us considerably in interpreting much hitherto obscure, and it deserves careful study; a result we trust that will follow, on the perusal of our curt notice of a few of the important propositions advanced in its pages.

Mr. Birkett contributes to the "Reports" a very practical surgical paper on "Cases of Inguinal Hernia depending upon Abnormal Conditions of the Vaginal Process of the Peritoneum." "One object of this paper is to group together a number of cases which have been under the observation of the writer, so that its readers may glean from them many valuable practical hints relating to the diagnostication[1] and treatment of sometimes very obscure cases. Another intention is to demonstrate the varieties of this kind of hernia, the anatomical characteristics of each, and the period of life at which they are most commonly developed."

The collection of cases thus published, will be always of value for reference; but it would be of slight utility to attempt an analysis in these pages. Moreover, the narrative of the cases, with comments upon them, occupies fifty-four pages of the present volume; and Mr. Birkett announces, in conclusion, his readiness to continue the subject, and make his contribution a complete essay upon inguinal hernia. If the design be carried out, the whole essay will rightly claim a special notice, especially as it will most likely appear as a distinct and independent treatise. At present, therefore, we are content to indicate the varieties of inguinal hernia dependent on abnormal conditions of the vaginal process, established by Mr. Birkett. These are :—1. A. Those in which the vaginal process of the peritoneum remains open along its whole extent. 1. B. Those where a constriction of the vaginal process constitutes an impediment to the reduction of the hernia, and is the cause of strangulation. 2. Cases of hernia associated with mal-position of the testicle. 3. Those depending upon an open state of the funicular division of the vaginal process of the peritoneum.

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[1] Why not write "diagnosis," and save the multiplication of syllables?—Ed.

4. Those in which the canal of the vaginal process remains unobliterated, whilst its ventral orifice is closed, and a hernia pushes its sac before it along the open tube.

"When possible in each class, the cases are related in such an order as to show the ages when the hernia is developed, and the phenomena exhibited by the different conditions in which they have fallen under observation."

"On the so-called Amyloïd Degeneration," is the title of an essay by Dr. Pavy. The first notice of the morbid condition, known as amyloïd degeneration, is attributed to Dr. Hodgkin, who, in 1832, published a paper "On some Morbid Appearances of the Absorbent Glands and Spleen," in the "Medico-Chirurgical Transactions" (vol. xvii). The disease was subsequently noted by Dr. R. Bright, Dr. Carswell, and others. After further historical memoranda, Dr. Pavy introduces Virchow's presumed discovery of cellulose in waxy spleen, and the hypothesis of amyloïd or starchy degeneration. He next sketches the chemical relations of the animal and vegetable products belonging to the starch series of compounds, and compares with them the matter, whether in the corpuscular or in the granular form, which Virchow and others have pronounced to be similar in chemical affinities.

This portion of Dr. Pavy's essay, and also some of the remaining section, appear to add nothing to the more elaborate account of the history, pathology, and chemistry of amyloïd degeneration published in the pages of this Review, in the first instance, in vol. xiv. 1854, p. 413, and p. 439; and again in vol. xxvii. Oct. 1860, p. 442, and vol. xxviii. Jan. 1861, p. 52.

The original matter Dr. Pavy adduces is derived from certain experimental inquiries he has himself undertaken. He discovers no other circumstance that can be assumed to countenance the notion that lardaceous disease is the result of a deposit of an amyloïd character, than the coloration produced by iodine; and the object of his experiments has therefore been to determine whether this coloration is in any way distinctive of such a character. His conclusion is that the colour produced depends upon a simple absorption of the iodine, and "is not the result of a definite coloured product, like the product of union between iodine and starch, or iodine and dextrine, but is due to iodine as such, which is absorbed more greedily, as it were, and held more firmly by the lardaceous deposit, than by ordinary forms of animal matter." Moreover, when iodine combines with starch or dextrine, "the colour is *immediately* removed by the application of heat, but may be instantly restored by the influence of cold," whereas the colour produced in lardaceous deposit by iodine, "only *gradually* fades with the evolution of iodine as ebullition is kept up, and cannot afterwards be restored by the influence of cold."

The question whether the properties of the lardaceous deposit depend on a peculiar fat, as supposed by H. Meckel,[1] has also been examined by Dr. Pavy; and his inference is, that "there is nothing peculiar in the reaction of the fat of the lardaceous organ. Indeed, the reaction of the lardaceous deposit with iodine cannot be due to a fatty matter, because the same reaction occurs when all fat has been extracted."

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[1] See this Review, vol. xiv. 1854, p. 413.

Having satisfied himself, therefore, that the material of lardaceous deposit is neither an amyloïd, nor a fatty principle, Dr. Pavy proceeds to demonstrate its albuminous nature: "In its character of insolubility, it resembles chitine, and there is also a similarity of behaviour between the two with iodine," and altogether it seems more allied to chitine than to anything else.

Whatever be its chemical nature, its effect is to destroy the functions of the parts invaded. It simply accumulates in them, and shows no disposition to undergo organization.

Dr. Pavy next enters upon the description of the appearances, microscopic and other, of lardaceous deposit, and concludes by briefly noting its consequences on the functions of the principal organs of the body—consequences which he oddly terms "clinical disturbances." On what etymological principle morbid results are named "clinical disturbances," we cannot imagine.

Mr. Hilton details "Two Cases of Chronic Impairment of Hearing Improved after Scarlet Fever and Erysipelatous Sore Throat," and an account of the "Dissection of the Ear in a Case of Deafness."

There is this point very curious in these histories, that they are all three furnished by members of the same family—a mother and two sons. The dissection of the ear in the son, who died suddenly during an attack of rheumatic fever, after having been deaf for sixteen years, was minutely made, and accompanied by microscopic examination. The whole account of it, therefore, forms an interesting chapter to the pathology of deafness.

The concluding essay of this volume is by Mr. A. E. Durham, and is devoted to those remarkable conditions of the bones which are called respectively mollities ossium, or osteo-malacia, and osteo-porosis, especially that form of the latter which, when affecting the head, has sometimes been designated hyperostosis cranii. Three cases of mollities ossium are first detailed, and several examples of this rare disease, in the museum of Guy's Hospital, referred to.

These details of cases and specimens are followed by a dissertation on the causes, symptoms, and phenomena of mollities ossium, the researches of Litzmann being referred to, particularly for statistical material. Of 145 cases collected by that writer, 13 only were males, and 132 females. Of the females, 91 were first affected during pregnancy, or very shortly after childbirth. The precise cause of the disease is still a matter of uncertainty. Beylard expresses his opinion that an antagonism appears to exist between tubercle and mollities ossium, so rarely does the latter malady concur with the former.

The only feature in common discoverable in the cases satisfactorily described is, says Mr. Durham, "the existence of some influence or other, or of some combination of influences, well known to be capable of producing great general depression of the nervous system," and "on the whole, it seems probable that mollities ossium is to be regarded as a particular expression, as it were, of a general morbid condition of the system, rather than as a special disease of the bones themselves," the affection of the bones being determined by the special proclivity of osseous tissue to degenerative changes.

After an enumeration and discussion of the symptoms of mollities ossium, Mr. Durham enters on a description of the microscopic and chemical characters of the diseased bone, derived from his own examinations. He believes "an increased quantity of blood is present in the bones, at any rate during the earlier stages of the disease, but whether as a cause or a consequence there is no evidence to show. In the later stages of the disease, the minute vessels in the affected bones appear to become more or less highly congested and dilated; in later stages to degenerate, and in some instances to rupture." The first indication in the bone structure is an alteration in the bony matter itself, which becomes more opaque and less uniform in appearance than natural. "The semi-translucency and apparent homogeneity of material" of healthy bone are more or less lost; and next, the lamination of the tissue grows less distinct, the several laminæ becoming fixed together. The bone corpuscles, or laminæ, are not, as some represent, more numerous than usual, though they enlarge, and consequently become more approximated. In the next place the earthy matter of the innermost laminæ is more or less completely absorbed, and consequently the Haversian canals are seen surrounded by a comparatively clear and transparent ring of animal matter. Disintegration and absorption of the animal substance advance together, "the regular Haversian canals are all more or less completely destroyed; and, as a general effect, the bone assumes a hollowed out, porous, or sponge-like appearance." In the ultimate phase of the disease, the irregular laminæ intervening between the regular Haversian systems are themselves absorbed, and "nothing is left of the original bone fabric but a delicate network of fibres and shreds of membrane, here and there dotted by minute fragments of undestroyed bone or adherent particles of amorphous earthy matter."

"The process of disintegration appears to go on much faster than that of absorption, for a large quantity of débris, organic and inorganic, is always to be found helping to fill up the spaces which would otherwise be left vacant by the destruction of osseous tissue. Mixed with this débris are the contents, more or less altered, of bloodvessels which, having been previously distended, have finally ruptured.". . . Amid the animal débris are also shreds of membrane, ill-defined fibres, cell-like bodies and fat, either free as oil-globules, or contained in ill-developed or degenerated fat cells;" and lastly, many proper "marrow cells."

As far as Mr. Durham can judge, the cells occasionally found in greater or less abundance in the breaking down tissue, have nothing distinctive about them, and are probably "formed by the coalescence of the histolytic molecules, rather than by any proper process of cell-development. This remark especially applies to what have been described as 'laminated amyloïd' corpuscles." Lastly, however the disease may have progressed, there is no evidence of anything like "malignant cell-growth." We have not space to follow Mr. Durham in his examination of the chemical changes in the diseased bone. He subjoins two analyses, and after laying down the general conclusions chemical examination suggests, points out that the best chemical analysis is, in relation to "the extreme complexity, heterogeneity and ever-varying character of the structures submitted to it," both coarse and clumsy, representing "only an average, and that an unfair one, of the composition of a great number of particles of bone in different conditions and differently constituted."

Osteo-porosis is briefly considered by Mr. Durham at the conclusion of his excellent essay. He recognises two varieties. In one the bones are more or less uniform in structure, spongy, light, and somewhat disposed to crumble. The appearance of such has been likened to that of dried mortar. In the other, the bones are extremely hard, dense and heavy, but have, like the former variety, a certain rough irregularity of structure. The former constitutes porous, and the latter solid hyperostosis. The porous form Mr. Durham maintains, "illustrates the changes which ensue when the progress of mollities ossium has been arrested, and a more or less successful attempt at repair and the re-establishment of normal nutrition has been set up. The dense and hard series, on the other hand, similarly illustrates the cure of rickets, under certain peculiar circumstances and conditions."

To the discussion of these hypotheses Mr. Durham proposes to return in a subsequent volume of the 'Guy's Hospital Reports.' The paper just analysed is illustrated by three excellent plates.

PART SECOND.

Bibliographical Record.

ART. I.—*Undersögelser angaaende Forekomsten af Indvoldsorme i Hundens og Kattens Tarmkanal i Danmark og paa Island.* Af Dr. med. H. KRABBE. (Særskilt Aftryk af 'Tidsskrift for Veterinairer,' 12te Bind.)

Investigations respecting the occurrence of Intestinal Worms in the Dog and in the Cat in Denmark and in Iceland. By H. KRABBE, M.D. (Reprint from the 12th volume of the 'Veterinary Journal.') 8vo, pp. 21.

SINCE the researches of von Siebold, Küchenmeister, and R. Leuckart revealed the connexion between vesicular and cestoïd entozoa, the tæniæ of the dog have acquired a special interest, not so much on this animal's own account as because the ova of these parasites furnish the germs of various hydatid affections, often of a very dangerous nature, both in man and in domestic animals. The study of these worms has, moreover, received an impetus from the discovery made within the last ten years, that an affection very prevalent in the human subject, which was formerly looked upon as inflammation of the liver, consists in the existence in that organ of a vesicular cestoïd—namely, echinococcus.

The author examined 500 dogs from Copenhagen and its immediate vicinity, and met with Tænia marginata 71 times, or in 14 per cent.; T. coenurus, 5 times; T. serrata, once; T. echinococcus, twice; T. cucumerina, 240 times; Bothriocephalus sp., once; Ascaris marginata, 122 times; Dochmius trigonocephalus, 9 times.

In 83 cats, likewise from Copenhagen, he found Tænia crassicollis 5 times; T. elliptica, 49 times; Bothriocephalus, twice; Ascaris mystax, 46 times.

In Iceland, out of 100 dogs, all the animals being more than a year old, he found Tænia marginata, 75 times; T. coenurus, 18 times; T. echinococcus, 28 times; T. cucumerina, 57 times; T. canis Lagopodis, 21 times; Bothriocephalus fuscus, twice; B. dubius, twice; B. reticulatus, once; Ascaris marginata, twice.

"Of the cestoïd worms, therefore, the first four occur in Iceland as well as in Copenhagen, but much more frequently; the last four are peculiar to Iceland, and have not hitherto been known. The ascaris is much rarer; T. serrata and Dochmius trigonocephalus seem to be altogether absent."

"While in Copenhagen only 21 per cent., or about one dog in five, has one or other of these vesicular cestoïds, in Iceland the latter are met with in 81 per cent., or in four dogs in five. T. marginata occurs 4, T. coenurus 18, and T. echinococcus 47 times more frequently in the dogs of Iceland than in those of Copenhagen, and particularly the great frequency of T. echinococcus is highly interesting; it is found in one-fourth of the dogs of Iceland. The number, too, of specimens of these three vesicular cestoïds in the one dog was much greater in Iceland. While T. marginata was in Copenhagen most frequently found solitary, in the dogs of Iceland several specimens, up to 20, were readily met with in the same animal; once I found as many as 24. Of T. coenurus most frequently under 10 were found, but almost as often more, up to 30, and on one or two occasions from 150 to 180. That this cestoïd occurs in greater number in every dog than T. marginata, is easily explained by the fact that its parent form is furnished with many cestoïd heads, while the Cysticercus tenuicollis has only one head. T. echinococcus was always present in great, sometimes even in surprisingly large numbers." (p. 12.)

From his investigations the author infers, with reference to the origin of echinococcus in man, that there are in Iceland no other cestoïds in the dog which can be taken into account than the Tænia echinococcus, and that the latter occurs in Iceland many times more frequently than in Copenhagen, tallying with the much greater frequency of cestoïd disease in the human subject in the former than in the latter locality.

From experiments by the author, in every respect confirmed by one by Dr. Naunyn of Berlin, it would appear that the echinococcus of man and that of domestic animals constitute one species, and that both become developed into, and consequently also proceed from, the Tænia echinococcus of the dog.

The principal source of the latter must, however, be sought in sheep and oxen. While, therefore, both man and household animals derive their echinococci from the dog, the latter gets his chiefly from other domestic animals, and in accordance with this fact it is found that echinococcus occurs extremely frequently in oxen and sheep in Iceland.

The number of dogs is excessive in Iceland, which in itself tends to keep up the disease. The author proposes to remedy this state of things by the imposition of a dog-tax. Great care should be taken also to prevent dogs eating the intestines of slaughtered cows and sheep, when these contain hydatids.

The author tried some experiments with various anthelmintics upon dogs. Ten dogs, brought in as being without owners, were killed after the conclusion of the experiments, to see what remained after the treatment.

"Eight got half an ounce of powdered male fern root twice a day for some days, followed by an aperient; two got two ounces of kousso once a day for a couple of days. Only by two, one of which had got male fern root, the other kousso, were some joints of T. cucumerina voided. On examination after death it was found that the animals all contained intestinal worms—namely, six times Ascaris marginata, four times T. cucumerina, and once T. marginata. The remedies had therefore been extremely inefficacious, but probably too little had been given." (p. 19.)

At Reykjavik, the author tried upon 17 dogs kamela in doses of two ounces given once, and in a couple of instances repeated the following day.

> "The locality where the experiments were tried was badly circumstanced, so that the nature of the evacuations could not be satisfactorily ascertained. However, in the discharges, joints of T. marginata were found three times, T. cucumerina once, and T. canis Lagopodis once. On examining the intestinal canal after death, T. canis Lagopodis was found in six of the dogs. As in none of these 17 dogs were any vesicular cestoïds met with in the intestinal canal after death, while in dogs of Iceland which had not got vermifuges they were met with in four cases out of five, we may assume that they had been present also in several instances, but had been expelled. It would hence appear that kamela is effectual in expelling the vesicular cestoïds, but that it has only a slight effect upon the T. canis Lagopodis. On various occasions the remedy produced diarrhœa, sometimes vomiting, but not until several hours after its administration; probably, however, a smaller dose would have been effectual."

In conclusion, the author insists upon the importance to the Icelanders of observing the greatest possible cleanliness with respect to dogs, of keeping them as far as possible from their dwellings, and of preventing them from coming in contact with articles of food, with implements used in eating or drinking, or with the sleeping places.

ART. II.—*On the Brine Springs of Cheshire, and on the Function of Salt in Agriculture.* By A. BEAUCHAMP NORTHCOTE, F.C.S., Senior Assistant in the Royal College of Chemistry. (From the 'Philosophical Magazine' for September and December, 1807, pp. 16 and 11.)

To such of our readers as are interested in agriculture, and are desirous of imparting useful knowledge in their country visits, we think a brief notice of the above-named papers may be acceptable.

The first contains a well-written, succinct history of those remarkable springs, the working of which dates from a time anterior to the Norman Conquest, and is followed by a careful chemical analysis of their contents. Amongst the numerous ingredients found in them, it is satisfactory to find that bromine is mostly present, and in a notable proportion.

The second paper, that "On the Function of Salt in Agriculture," has for its object, not the inquiring whether salt is useful when applied to the land, which the author holds to be proved unquestionably, but the manner in which it acts. The results of some carefully-conducted and well-devised experiments are the following, which we shall give in his own words:

> ". . . . That agricultural salt is a most energetic absorbent of ammonia, both in virtue of its chloride of sodium and of its soluble lime-salt, and that the proportion of the latter especially most powerfully affects its action; but,

at the same time, its agency does not seem to be altogether a permanent one: it will collect the ammonia, but it is questionable whether it can retain it for any great length of time, because in the very decompositions which happen in order to render the ammonia more stable, salts are formed which have a direct tendency to liberate ammonia from its more fixed combinations. It may, however, retain it quite long enough for agricultural purposes: if the young plants are there ready to receive it, its state of gradual liberation may be for them the most advantageous possible; and to this conclusion all experiments on the larger scale appear most obviously to tend. It is described as an excellent check to the too forcing power of guano, and, from M. Barreil's experiments, we see that it either prevents the too rapid exemacausis of the latter, or stores up the ammonia as it is formed. As a manure for growing crops, all experience and all the theoretical considerations therefore show it to be most valuable; but when employed to mix with manure-heaps which have to stand for considerable periods of time, theory would pronounce, as practice has in many cases done, that its power of retaining ammonia under these circumstances is at the best doubtful."

ART. III.—*Cavernes du Périgord. Objets Gravés et Sculptés des Temps Prehistoriques.* Par MM. ED. LARTET et H. CHRISTY.—*Paris,* 1864. pp. 37.

The Caverns of Périgord. Engraved and Sculptured Objects belonging to Prehistoric Periods. By MM. ED. LARTET and H. CHRISTY.

THIS interesting brochure appeared first as a communication to the 'Révue Archéologique.' It furnishes a most valuable chapter to the history of pre-historic man, making us acquainted with his first essays at ornamentation, with his mode of living, his food and the means used to obtain it. It exhibits man as coëval with animals long extinct historically, and now only known to the palæontologist, and by itself therefore furnishes abundant proof of the existence of the human race in a remote antiquity far antecedent to the period popularly assigned as that of the creation of man.

The subject-matter of the essay is derived from an examination of several limestone caverns in the ancient province of Périgord, situated in the valleys of the Dordogne and Vézère. The floor of these caverns, where undisturbed, is principally composed of animal *débris*, of the bones and horns of animals, agglomerated by calcareous matter into a breccia. In several caverns this deposit has been largely removed for the purpose of manufacturing saltpetre, and consequently numerous vestiges of primeval man have been inadvertently destroyed. Here and there a remnant of the ancient dwellers in these caves has been brought to light in the shape of a tooth or a fragment of bone. But besides such human remains are found arrow and spear-heads, flint hatchets, articles of personal ornament and of utility worked in bone and horn, and lastly, some sculptured plates of schist, &c., representing animals. The material principally employed in preparing the useful and ornamental articles discovered is the horn of the reindeer, an animal now unknown in Europe, except in the high latitudes of

Lapland. The bones of the horse are also largely met with, that animal apparently having been chiefly or wholly used for food. Among extinct animals whose remains occur, are Elephas primigenus, Rhinoceros tichorhinus, Hyæna spelæa, and Ursus spelæus. There is no evidence of any animal having been domesticated among these ancient people, not even the dog. Both birds and fish constituted articles of food.

Animated by the principles of true searchers after truth, the explorers of these caves sent portions of the floor to the chief scientific institutions of Europe concerned with such studies, and we were not long since gratified to learn that the British Museum had acquired by purchase several considerable specimens of similar origin, which have been submitted to the able curator of the Natural History Department, Prof. R. Owen, and have been already reported upon by him. Very large additions to our knowledge from these and other explorations of caverns and other localities inhabited by pre-historic races may be anticipated. What has been hitherto accomplished, however, suffices to the establishment of a new branch of ethnology, and of the doctrine of a remote antiquity of our race heretofore scarcely imagined.

Art. IV.—*Therapeutiske Supplementer.* Af Dr. og Prof. med. Oluf Bang, Conferentsraad, Commandeur af Dannebrog og Vasa, Dannebrogsmand.—*Kjöbenhavn,* 1864. 8vo, pp. 100.

Therapeutic Supplements. By Professor Bang.

These notes, by Professor Bang, written by request in the form of familiar letters to a friend who did not live to see them published, contain in a brief space the experience and views of the veteran professor respecting the numerous acquisitions with which the discoveries of the last ten or eleven years have enriched the science of practical medicine. The work, small as it is, consequently treats of a vast number of topics, to each of which but little space is devoted, so that any attempt to analyze it is out of the question. In one of his introductory sections the author describes, in an amusing style, the great changes which have taken place in the practice of physic since he entered the profession upwards, we believe, of half a century ago. Then the physician employed only what he had brought from his mother's womb, and had since developed and exercised in the discharge of his functions, his inner and outer senses, which latter he was far from using as extensively as now; his ear, for example, was almost restricted to listening to his patient's report. Now his armoury is scarcely less furnished than is that of the surgeon, and for what he employs in the immediate diagnosis of disease, he has seldom as much room in his pocket as the surgeon has for his instrument-case. How much more time, too, does he not now spend in his education and practice? How much in the examination of the sick? This is taken into account neither by his private nor by his public paymasters. An hospital physician devotes double as much time to the same number of patients, a private physician double as many hours to his practice. It is now not enough to hear the patient tell what ails him—it is not enough that the fingers feel the pulse, that the eye takes cognizance of the tongue, the countenance, the secretions or the skin; it has not discharged its duty until it has looked as deeply as possible into all orifices by the aid of the many various specula, which have long been invented or daily are so; *endoscopy* has become more necessary to a complete diagnosis. The physician must, moreover, measure, thermometrise, percuss, stethoscopise, microscopise, analyse the blood and the excreted fluids. For the ancient uroscopy, which has again come into fashion, apparatus suitable for analysing urine is required. In addition to the old specula we must have a number of new ones, the rhinoscope, and especially the laryngoscope. The specialists alone seem hitherto to have had need of the ophthalmoscope, but this has acquired a more general diagnostic importance since it has been thought that signs of certain cerebral and renal diseases are discoverable in the eye. The spirometer may be dispensed with, but not a good electrical apparatus, which does double service as a diagnostic and therapeutic agent. The author enumerates some other instruments of less established utility, and adds a long list of new medicines, many of which are valuable accessions to the resources of the practitioner. We need scarcely say that his 'Therapeutic Supplements' is a most interesting and extremely useful compendium.

ART. V.—*A Dictionary of Chemistry.* By HENRY WATTS, B.A., F.C.S. Vol. I.—*London*, 1863. pp. 1137.

MR. WATTS'S 'Dictionary of Chemistry,' though founded on that of Dr. Ure, is essentially a new work. By far the greater part of the first volume is written either by the editor himself or by the chemists whose services have been secured for the present undertaking. In fact, if still more of the old matter had been omitted, the book would have been better. While, therefore, the majority of the scientific articles, now first published, are well planned and well executed, not a few of the mineralogical and technological notes require revision. It is not that we looked for fuller details than are given of these matters, but we expected to find the information correct, consistent, and recent, and in some instances we have been disappointed. We may cite, as an example, the following paragraph:

"BECKITE.—This name has been given to a mineral from Paynton, in Devonshire, which, according to Kenngott, is merely a coral hardened into a chalcedonic, or hornstone variety of quartz, intergrown with compact grey limestone." (p. 526.)

Now, the name of the so-called mineral here referred to is Beekite, not Beckite, while its formation is due to one of the most interesting and important actions known to chemical geologists—namely, the replacement of carbonate of calcium by silica. This change occurs in several formations, and the localities where the beekite is found are numerous. It is occasionally seen in mammillated concretions upon limestone; but the expression "intergrown" is not appropriate to this condition of the mineral.

Other instances of this defect of the Dictionary might be easily given. Thus, on page 132, is a full description of the mineral allophane. But the occurrence of this interesting mineral in England, and the recent analyses of it, are not alluded to; in fact, the notice represents our information on the subject fourteen years ago. On page 165 it is stated: "The occidental amethysts are merely coloured crystals of quartz," the distinguishing character between amethyst and quartz—namely, the "rippled" fracture of the former—being ignored. Again, on page 192, the discovery of the formation of nitrite of ammonium by the action of ferric oxide, of chromic oxide, or of platinum on mixed ammoniacal gas and air, is not referred to. We might further justify our criticism, but will only add two more examples. Though it is commonly stated that the planes and knife-edges of the best balances are of agate (p. 482), yet corundum (sapphire) is the material really used; and "harpsichord wire," mentioned on page 263 as the purest form of iron for volumetrical analysis, is not only a somewhat antiquated expression, but pianoforte wire is now made of steel, and cannot be reckoned as pure iron, often containing no more than 97 per cent. of that metal. A particular kind of iron wire is made from Bessemer's malleable iron, and is sometimes found of nearly perfect purity. One specimen of this wire contained 99·67 per cent. of iron, and therefore might be used for preparing at once a standard solution of the metal.

The typographical errors in the work under review are more numerous than they ought to be. In addition to the portentous list of errata (one hundred and ninety-six in number) given on pp. ix. to xi. of the first volume, careful reading of part of the text has shown us scores of unrecorded mistakes, such as "*tri*bromopropionic acid, $C_3H_4Br_2O_2$," p. 993; "Oxide of Cinnamyl and Benz*ol*," p. 990, instead of Benzoyl; "*prolonged* light," p. 729, instead of polarized light; "*igniting* with ether," p. 729, instead of agitating with ether.

It may be said that the imperfections to which we have alluded are not of much importance. We readily admit that the work, taken as a whole, is of very high merit. The longer articles in it, relating for the most part to scientific chemistry, demand especial praise. The accounts given of "Acids" p. 39, "Amides" p. 169, "Ammonia" p. 182, "Analysis" p. 210, "Atomic Volume" and "Atomic Weight" p. 440, "Balances" p. 481, and "Classification" p. 1007, may be selected as characteristic specimens of the work under review. The first and last of the above-mentioned articles are by Mr. G. C. Foster, of the Andersonian Institution, Glasgow. They are remarkably clear expositions of the principles upon which chemical compounds may be systematically arranged. Here we find the views of Gerhardt on this subject followed in the main, with such developments as further researches have rendered absolutely necessary. The remarks (p. 1022) on the three bases of classification, show distinctly the philosophical spirit in which chemists are now approaching the study of the deeper problems of their science. We extract a few words relating to this subject:

> "The classification of a number of substances as containing the same radicle expresses that they are mutually convertible by comparatively simple processes—that is, that they are *genetically* related; while the classification of any set of bodies by reference to the same type, expresses that they are capable of undergoing similar transformation, and are therefore functionally related. All our strictly chemical knowledge, however, consists in a knowledge (1) of the nature and proportion of the elements of which substances are composed; (2) of their genetic relations, or of the bodies from which they can be formed, or to which they can give rise; and (3) of their chemical functions, or the transformations which they cause or undergo when they react with other bodies." (p. 1022.)

The articles treating of ammonia and ammoniacal salts (with several other contributions) are due to the late Mr. F. T. Conington, of Oxford, who, though he may not have been a discoverer, yet possessed an unusual faculty of selecting and arranging skilfully the results obtained by chemical workers. The long article on Analysis, partly written by Mr. W. J. Russell, is most exact and trustworthy, especially so far as relates to the directions for volumetric analysis; it forms, in fact, quite a manual for use in the laboratory, The account of atomic weight and atomic volume unfolds in a most satisfactory manner the reasons for the changes in formulæ which the unitary notation demands; a few, perhaps, of the more ardent and advanced disciples of the unitary school may consider it in part out of date, but it is possible that the further alterations demanded by Cannizzaro and Wurtz are scarcely warrantable. Professor Odling, the author of the accounts, has, however, announced his intention of discussing the subject further in a subsequent volume of the Dictionary. The article on the Balance by Mr. W. S. Jevons, is well written, but it would have been rendered more interesting if a further account of the instruments used by M. Stas, in his remarkable researches on atomic weights, had been given, together with some of the results, both as regards the balance and the weights, of weighing *in vacuo*.

When this great work is complete, we trust that a supplement to it will be occasionally published, so that, like Dana's Mineralogy, it may record the progress of the science, and thus be prevented from becoming in great measure useless within a few years of its completion.

The adoption of the unitary system by the editor of this important and extensive Dictionary, is not only a proof of the growing esteem in which that system is held, but is likely to aid its progress greatly.

ART. VI.—*Tables of Chemical Formulæ.* Arranged by W. ODLING, M.B., F.R.S.—*London*, 1864.

THESE tables refer especially to the atomic weights and classification of the elements. We find the 1st Class to consist of *perissad* elements, combining with an odd number of chlorine atoms, and further subdivided into monads and triads. The 2nd Class contains elements which combine with an even number of chlorine atoms, and these are therefore termed *artiads;* they may be either dyads or tetrads. Again, a 3rd Class exists, known as *periss-artiads*, the members of which combine with both odd and even numbers. Types, homologues, families, hydrocarbons, chloro-derivatives, ortho- and meta-compounds, normal and anomalous vapour-densities, equivalent formulæ, and oxides, are arranged in due order in other tables. Table VI. gives the atomic heat of many of the elements; it also gives the product of the specific heat into the atomic weight, generally a constant (6·2) and now believed to be one of the best guides in fixing upon that multiple of the lowest possible atomic weight of an element which must be adopted as the true atomic weight. For this reason, among others, several atomic weights have been lately doubled—those of aluminium and iron, for instance—so that the old *sesquichloride* of iron $Fe_2 Cl_3$ is written by Prof. Odling $Fe''' Cl_3$. But the proposition has been made to double it again, and thus we arrive at the formula $Ffe^{vi} Cl_6$. Prof. Odling seems undecided as to whether this greatly increased atomic weight is the true one, and he continues to use what he calls the "time-honoured triatomic formulæ." Hardly time-honoured yet, for they have been introduced but a year or two. These constant changes, though perhaps unavoidable, are to be regretted, for they discourage chemical students from pursuing the unitary system, while they lead those who are averse to the general introduction of chemistry into colleges and schools to regard its study of little value in mental culture, because of the apparently unsettled condition of the foundations of the science.

ART. VII.—*De L'Inosurie.* Par le Docteur N. GALLOIS, Lauréat de l'Institut, &c., Paris.—*Londres*, 1864. pp. 61.

On Inosuria. By Dr. N. GALLOIS, M.D., &c.

IN this paper we have an excellent example of organic-chemical and pathological research, happily fruitful in good results.

The conclusions at which its author arrives show in what a very comprehensive manner he has treated the subject. Before stating these, we may briefly remark that the substance of which he treats, and the properties of which he so well describes, are of much and increasing interest, and deserve to be much better known, it having been found in most animal tissues besides muscle, in which it was first discovered, and from which it derives its name (from ῖς, ῖνος, muscle), and in at least one vegetable, the green haricot. The organic compounds to which it is nearest allied are glucose, cane-sugar, the sugar of milk, and starch. It resembles the three first in having a sweet or sweetish taste. From these and also from uric acid, it is sufficiently distinguishable, according to the author, by the rose-colour which it exhibits when tested by the methods he describes. The test he relies on is one which may be used with tolerable ease. For the particulars as to its employment, and the precautions required to avoid error, we must refer to the paper itself.

Dr. Gallois' conclusions are the following:—

"Inosite by its chemical composition belongs to the group of sugars, and is occasionally found in the urine; when so found, the phenomenon may admit of being designated Inosuria.

"Neither in man nor in different animals have I ever found it in the urine, whilst they were healthy; but there are pathological conditions during which it does occur in the renal secretion.

"M. Cloetta, who first discovered it in urine, found it accompanied by albumen or glucose, and the same has been observed by MM. Lebert and Newkomm. My own researches have afforded results confirmatory of theirs.

"But, though inosuria and glucosuria may exist simultaneously, it is right to state that the reunion of these two symptoms is comparatively rare, and that the latter is most frequently met with without the former.

"When sweet urine is inositic, the proportion of glucose may be either considerable, or extremely minute: respecting its quantity, no rule can be laid down.

"When inosite is found in albuminous urine, the presence of glucose is probable, and is likely to be detected on careful examination made either at the instant, or at a later or earlier period.

"In polyuria, which has many of the symptoms of diabetes mellitus, I have never detected inosite in the urine. Nor have I, with the exception of the last-named disease, and acute and chronic albuminous nephritis, ever detected it in the very many specimens of morbid urine which I have analysed;[1] nor

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[1] In the following table, given by the author, the diseases are named in which he sought for inosite in the urine without success; the second column shows the number of analyses made:

Pulmonary tuberculosis	4
Bronchial catarrh	2
Pneumonia	2
Purulent pleurisy	1
Tuberculous peritonitis	1
Chloro-anæmia	2
Icterus	3
Bilious fever	1
Dyspepsia	3
Affection of heart	2
Gout	3
Renal calculus	4
Variola	2
Anthrax	1
Spermatorrhœa	1
Sciatic neuralgia	2
General paralysis	2
Nervous asthma	1
Hypochondrism	1
Amaurosis	1
Diabetes, relieved at the time	1
	40

He adds, that out of a total altogether of 102 examples of pathological urine, he have I found it in the urine of women during lactation, when that fluid acts so powerfully on the cupro-potassa solution.

"The result of my researches is that inosuria cannot in strictness be considered a disease, but merely a symptom.

"Inosite, as it occurs in the organism, does not appear to be derived from the food, nor from the metamorphosis of glucose.

"Its formation in the economy seems to be closely connected with the glucogenic function of the liver, and like dextrine and glucose to be one of the products resulting from a glucogene matter.

"Proof of this source is afforded by the fact that the puncture of the floor of the fourth ventricle gives rise in certain cases to the production of inosuria, as it does to glucosuria."

ART. VIII.—*Essai sur la Nature et le Traitement du Choléra.* Par ADOLPHE RODRIGUES-BARRAUT, D.M. Edin., Médecin Attaché au Dépôt de l'Immigration, &c., Ile Maurice.—*Maurice*, 1863. pp. 36.

Essay on the Nature and Treatment of Cholera. By Dr. A. R. BARRAUT, &c.

THIS paper is chiefly deserving of notice on account of the mode of treatment employed by its author, and the apparent success attending it during the epidemics with which the Mauritius was visited in 1859 and 1862. During the first of these epidemics, of 58 cases which came under his care only 10 proved fatal; and during the second, the proportional mortality was as small, 18 only dying.

The medicine he has trusted to mainly has been the extract of belladonna, in small doses of a quarter of a grain, given every half hour (this for adults), and continued until its physiological effects, such as dilatation of the pupils, &c., became apparent. Then the frequency of administering it, he says, should be reduced to every second or fourth hour, until there is a recurrence of the urinary secretion, when it should be stopped entirely.

The following is his account of its action when most successful: There is a cessation of the vomiting and of the alvine evacuations; all the distressing symptoms are relieved; the patient feels as if awakened from a long and frightful dream; the pulse is soft and small (75 to 80); the mental faculties are unimpaired, and the enfeeblement, with hallucinations and vertigo, so common after poisoning from belladonna, is never felt.

When cramps have been severe, he says, he has seen excellent effect from sub-cutaneous punctures with a lancet moistened with a solution of tincture of atropine; often the most violent spasms were thus relieved as it were by enchantment.

So long as the action of the medicine is remedial, so long as the disease is yielding under its influence, he assures us that none of the

has detected inosine only in 7, and then associated either with glucose or albumen. In that variety of diabetes designated by Dr. Willis azoturia, Dr. Gallois has never had an opportunity of analysing the urine; it has been found to contain urea in excess, but whether inosite also, remains to be ascertained. This he points out as a desideratum, and as such we mention it.

ordinary, that is, physiological effects of belladonna, such as are witnessed when it is administered to persons in health, are experienced.

He informs us that he was induced to make trial of belladonna in consequence of a favourable report of its efficacy in cholera by a French physician, Dr. Leclerc, of Tours, in 1856.

In all the cases, or in almost all, the results of which he gives in a tabular form, whilst he trusted chiefly to belladonna, he did not neglect other ancillary means commonly used, such as frictions, sinapisms, enemata, and drinks, according to the several indications. As a drink, he strongly recommends albuminous water—i.e., the white of an egg beaten up in a glass of cold water. This, he says, relieves thirst more than any effervescing drink ever invented. It may be used, he adds, without any restriction; it is best, however, given in small portions frequently repeated. We mention this, believing from some experience of our own that the white of egg used as thus prescribed has not had the attention it deserves, whether for assuaging thirst or for allaying irritation, as in the instance of hiccup, connected, as it sometimes is, with abrasion of the cardiac epithelium.

Belladonna he considers a stimulant acting chiefly on the nervous system. When its operation has been too powerful, as he has seen sometimes in persons of very excitable constitutions, he recommends the tempering of it by the addition of hyoscyamus, its extract or tincture in equal dose, the latter, he thinks, having specially a soothing influence.

The author finishes his well-written paper with a brief summary of the advantages he has found from the treatment with belladonna, which (we give it in his own words that there may be no mistake) is as follows:

"1. Facilité et promptitude dans l'exécution.
"2. Efficacité remarquable dans tous les cas.
"3. Exemption des dangers qui résultent de la fièvre consécutive.
"4. Convalescence rapide, et aucun trouble du côté de l'intelligence."

Much caution, we need hardly remark, is required in giving credence to the sanguine account of any new mode of treatment, whatever the disease may be, and especially of such a disease as cholera, in which so many different methods of cure and medicines have been tried with uncertain results, as indeed might be expected, taking into account that this disease, though always dangerous, yet, *per se*, varies at different times and places in the degree of its danger and fatality. What is stated of the effects of belladonna as administered by the author, inspires us with sufficient confidence to allow us to express the hope that, occasion offering, it will be put to the test of further experience.

ART. IX.—*On the present Position of Friendly Societies in England and Wales.* By SAMUEL BROWN, F.S.S., Vice-President of the Institute of Actuaries. (Read before the Institute of Actuaries March 21st, 1864, and printed by order of the Council.) pp. 24.

THIS is an instructive and well-timed pamphlet, and is deserving of a wide circulation. It gives an interesting account of friendly societies, as to their origin and increase, and various denominations and objects, the benefits they confer, and the risks from mismanagement to which they are exposed.

It is satisfactory to find how much they have profited as regards security by the legislation respecting them in 1855, inviting registration, but not compelling it. It is also satisfactory to learn, that when there have been disastrous failures, they have been owing, according to our author, in more instances to miscalculation than to dishonesty on the part of the official managers.

The funds accumulated by these societies are remarkable for their amount; it is calculated that in 1862 they reached 50,000,000*l.*, a sum, to the great credit of the working men in England and Wales, saved out of their hard-earned wages by prudence and self-denial.

From the returns collected by the Registrar and others, and the calculations of actuaries—those most reliable—the numerical results accord beyond expectation and remarkably as regards the rate of sickness as influenced by locality, and even by the density of population; the kind of occupation appears to have a greater effect, contrasting that with hard labour and light labour, with and without exposure to the weather.

Those of our readers who are in search of information on the statistics of the working class, of whom these societies chiefly consist, will do well to provide themselves with this compendious and ably-written pamphlet, so rich in facts and judicious remarks. The author, whilst he gives due credit to Mr. Gladstone for his great measure of the amended Government Annuities' Bill, does not give it his unqualified assent:

"But it would be sad indeed if, instead of improving and setting on a firm foundation the present friendly societies, it simply destroyed them in detail. The great antiquity of these funds for self-help is a proof that they meet the spirit of this people in every age. The changes that of late years followed a more enlightened legislation, evidence their desire to keep pace with the growing intelligence of the country. The meetings of the members when conducted in some room of their own, and away from the influence of the public-house, encourage that spirit of self-reliance and of participation in public business, and in the management of his own affairs, which the working man has a right to in common with the highest classes in the land. And, finally, the good feelings which in the country bring forth the clergy and gentry, and the manufacturers and employers of labour in towns, to aid with their judgment and advice, but without injudicious interference, the efforts of the working man to better his condition, and, by self-denial in the present, to look forward in the future, not merely to a provision for himself, but for his wife and children after him, form a bond of union which has happily united all classes in this kingdom, and made these friendly societies a medium of kindly sentiments, of generous sympathy, and of mutual respect, which would render the total destruction of them, whether by accident or design, a public calamity to this country."

ART. X.—*Elements of Physics, or Natural Philosophy. Written for General Use, in Plain or Non-technical Language.* By NEIL ARNOTT, M.D., F.R.S., &c. Sixth and complete Edition. Part I. —*London*, 1864. pp. 406.

OF the introduction to this work, the first edition of which we briefly noticed, we can write in terms of unqualified praise. It is admirably adapted to display the use of Physics as a branch of a liberal education, not restricted to any class or profession. The universality of its applications is well pointed out; its applications are indeed commensurate with the laws regulating the universe, and the forces comprised in these laws. As an example, in proof of the justness of this our commendation, we cannot do better than quote a portion of the 33rd section, entitled, 'Physics all-important to Medical Practitioners:'

> "And Physics is also an important foundation of the healing art. The medical man, indeed, is the engineer pre-eminently; for it is in the animal body that the highest perfection and the greatest variety of mechanism are found. Where, to illustrate *Mechanics*, is to be seen a system of levers and hinges and moving parts, like the limbs of an animal body; where such an hydraulic apparatus, as in the heart and bloodvessels; such a *pneumatic* apparatus, as in the breathing chest; such *acoustic* instruments, as in the ear and larynx; such an *optical* instrument, as in the eye;—in a word, such variety and perfection as in the whole of the visible anatomy? All these structures, then, the medical man should understand, as a watchmaker knows the parts of a time-piece which he is entrusted to repair. The watchmaker, unless he can discover where a pin is loose, or a wheel injured, or a particle of dust adhering, or oil wanting, &c., would ill succeed in restoring efficiency; and so also of the ignorant medical man in respect of the human body. Yet it is true that not long ago there were medical men allowed to practise who neither understood mechanics, nor hydraulics, nor pneumatics, nor optics, nor acoustics, beyond the merest routine; and that plans of medical education were tolerated which hardly noticed the department of *Physics!* That such was the case furnishes an illustration of what is stated in the beginning of this Essay—viz., that the sciences and arts have all been progressive, and that improved methods of education had to arise gradually, like all other things of human contrivance. It is within the recollection of persons now living, that political economy was discovered to be a grand foundation of the art of government, teaching the means of security against many national calamities common in former times, not excepting even famine and war. And the day is probably arrived when the members of the medical profession generally will understand how very much the correct knowledge of the animal structure and function, and of the remedial means, depends on precise acquaintance with Physics. Besides the strictly professional matters bearing on the treatment of disease, there are in Physics many others of a more general character, bearing on prevention: such are the subjects of *meteorology, climate, ventilation,* and *warming* of dwellings, &c. &c."

Such considerations fully justify our universities in requiring evidence of acquaintance with Physics in their earlier examinations for medical degrees.

In this introduction, we may remark further, we have not only a rapid and eloquent sketch of the progress of the physical sciences, but also of the progress of society itself and its civilization—the two, as Dr. Arnott shows, being intimately connected, and very much, we apprehend, in the relation of cause and effect: a proposition which, we hope, may at the present time be considered an absolute and established truth.

Amongst the many advantages which he points out as belonging to the study of natural philosophy, not the least important—the most important, mentally—is its fitness for the culture of the intellect; in which respect he insists, and possibly with justice, that it is superior to the mathematics, strengthening and quickening the judgment, as well as the senses and power of observation.

The introduction is followed by a synopsis, or a general view of the vast subjects included in Physics. It too we can commend, and for its clearness and comprehension.

Of the five parts of the work, the first three are contained in this volume: these relate mainly to ponderable matter and its phenomena; the two remaining parts, those relating to the phenomena of imponderable substance and the phenomena of the heavens, will form the second volume, the publication of which is promised immediately, and is to be accompanied by an alphabetical index.

Of the body of the work our notice must be very brief. Judging of the whole from the portions of it which we have read, we can honestly repeat the approval which we concisely expressed of the first edition, published nearly a quarter of a century ago. What we hold to be its chief excellences are, first, its fitness to excite the mind, create a desire for knowledge, and kindle a love for inquiry, by the marvels of nature which it displays, and explains in conspicuous and often eloquent words; and next, the soundness of the doctrines which it unfolds, the avoidance of vague hypothetical reasoning, and a strict following up of a sound logic, and the inductive method. Owing to the felicity of the examples chosen and the vast number of facts given to illustrate the several laws and principles, expressed in plain language, the reading of the work is made easy, and a charm is imparted to it, rendering it more than ordinarily attractive; and forcibly and happily blending instruction with amusement, showing how the wonders of nature exceed by far the fictions of romance.

ART. XI.—*British and Garden Botany, &c.* By LEO H. GRINDON. *London*, 1864. 8vo, pp. 869, figs. 230.

IN a recent number of this Journal we had occasion to notice in terms of commendation a little book on Elementary Botany, by Professor Oliver; and now another work, of somewhat similar aim but more extended scope, challenges attention. Mr. Leo Grindon's work comprises a description of the flowering plants, ferns, and trees indigenous to Great Britain, together with notices of all plants cultivated in this country for use and ornament, and is preceded by an introduction to structural and physiological botany.. Such is the comprehensive announcement of the title-page; and the promise there conveyed is, barring some defects to be hereafter alluded to, well and fairly carried out. The author, with great labour and ingenuity, has contrived a series of analytical tables, by the use of which an amateur or a tyro may, with very slight previous knowledge of the subject, ascertain the name of any plant he is likely to meet with in the field or garden, and at the same time he is made acquainted with its due position in the so-called natural system, and with any circumstance of popular interest connected with it. Details of the latter description are supplied in great abundance, and in such a form as to render the volume a very pleasant and agreeable book of reference. The work, indeed, seems well suited for the class of persons for whose use, as the preface tells us, it is especially intended—that is, "for persons who take an interest in plants and flowers, whether wild or growing in gardens, and who are wishful to acquire a knowledge of such portions of botanical science as are useful, agreeable, and easily at command, though without leisure to study botany in its minute details."

The intention of the book thus enunciated being well fulfilled, it may seem captious to raise objections to it on the score of its aim not being sufficiently high; and we should hardly have commented on the subject were it not for some remarks in the preface, wherein the author seems disposed to laud his own production at the expense of other works. Thus the keys and tables, the utility of which we frankly admit from having personally tested them, are certainly not constructed upon a different plan from any other ever published, and assuredly do not differ from the keys in all other works in being practical. What of the tables of Lamarck and De Candolle in the 'Flore Française?' What of those in Macreight's work on British Botany, or those in Bentham's 'Handbook of the British Flora?' Are none of these practical? Rather may we not ask, Has not Mr. Grindon, and properly so, availed himself of the labours of his predecessors? Again, when mentioning the claims of his book to favour on account of its simplicity and its advantages to beginners, he says that "these recommendations have not been secured by the sacrifice of minute scientific accuracy." A more modest statement would have been nearer the truth. To omit all mention of generic characters may add simplicity to the author's book and lighten the pupil's labour, but surely at a very great sacrifice of scientific accuracy.

A still graver charge may be laid against our author—that of tampering without due cause with the names of plants. Mr. Grindon, as it seems, when he finds a name that to his idea is not appropriate, changes it for another. Thus the harebell, known since Linnæus's time as *Campanula rotundifolia*, is by our author dubbed *C. heterophylla*, and without any reason whatever being assigned for the change.

Mr. Grindon cannot be so ignorant of the laws of botanical nomenclature as not to know that to alter established usage in this merely capricious manner is a very great sacrifice of minute scientific accuracy. These defects are serious ones to those wishing to gain a scientific knowledge of botany, and unfortunately they tend to mislead the dilettante and amateur by giving them a contracted idea of the true scope of botanical knowledge. The reader of the present book might pass pleasantly enough from title-page to colophon with scarcely a hint that there was anything more in botany than a mere enumeration of pretty, curious, or useful plants, with odd and pedantic names. That there was such a thing as Philosophic Botany, and that it ranks high among the sciences, would scarcely enter the mind of the reader, from the perusal of the present work.

In justice to our author, however, we must admit that the want we have alluded to is not by any means peculiar to his pages, but pervades the majority of elementary botanical works.

Art. XII.—*Excision of the Scapula.* By James Syme, F.R.S.E., Surgeon in Ordinary to the Queen in Scotland; Professor of Clinical Surgery in the University of Edinburgh; Member of the General Medical Council, &c.—*Edinburgh*, 1864. 8vo, pp. 35.

There is, perhaps, no man living who has done so much for operative surgery as Mr. Syme. His name is associated with several operations, which he has either originated or greatly improved, and which have now, after the lapse of some years, become the established practice in certain cases. Thus, he has introduced an admirable method of amputating at the ankle-joint; he has added to our means of dealing with stricture, and he has taught us how to reduce a "hernia testis." These are some of the most useful additions that he has already made to surgery; but this is not all that he has done. Within the last few years he has had three opportunities of removing the entire scapula, and the monograph before us contains an account of the cases in which this novel and formidable operation was performed.

The book commends itself to us by its simplicity. It contains nothing but a narrative of the cases, with a few obvious deductions, which it would be difficult to gainsay. The operations have been so far successful that Mr. Syme is evidently well content to leave them to speak for themselves. It needs no comment on his part to show the profession that the method of treatment he has adopted is well worthy of their attention.

The cases to which excision of the scapula is applicable are necessarily few. In Mr. Syme's large experience of severe surgical cases only three have arisen in eight years. And yet, as our author remarks, it is possible that they may be more numerous than we suppose, because they have hitherto been regarded as incurable. But whenever the scapula is the seat of a tumour which moves freely on the subjacent muscles, and does not implicate the skin to any great extent, the question of entire removal may fairly be entertained. In some cases it may suffice to take away a portion of the bone; but in others, especially if the growth is of a highly vascular kind, it would appear that the patient's best chance lies in complete excision.

In one case Mr. Syme removed the scapula alone; in another, the scapula and a portion of the clavicle; in the third, the scapula, part of the clavicle, and the arm. The hæmorrhage, although it was, as one would expect, considerable, does not appear to have been alarming. The wounds which were made were necessarily large and irregular, but it is surprising how readily and favourably they seem to have healed. Moreover, the degree of power and movement which the patients retained in those cases in which the arm was left, is much greater than one could have expected. The arm was by no means a useless appendage, but a very serviceable limb.

To remove the disease and nothing but the disease is the rule of modern surgery; and it is difficult to imagine how this principle could be more fully carried out than it was in two of Mr. Syme's cases, where the entire scapula was removed—and, in one instance, parts of the adjacent bones as well—and yet a useful arm was left.

It will be well for all surgeons to bear in mind this, the most recent addition which Mr. Syme has made to the resources of surgery. Cases which were formerly deemed hopeless may now be submitted to operation with a fair prospect of success; and, as our experience on the subject enlarges, we shall be able to speak more confidently of the value of excision of the scapula.

ART. XIII.—*La Folie devant les Tribunaux.* Par le Dr. LEGRAND DU SAULLE.—*Paris,* 1864. pp. 624.

On Insanity in the Law Courts. By Dr. LEGRAND DU SAULLE.

THE attempts to define insanity and to discover some distinct boundary between it and mental sanity, have hitherto all lamentably failed, and, what is more, will ever fail, for insanity is, in fact, a general term, and as such indefinable. However, it is most essential to the interests of justice and humanity to be able to appreciate those conditions and phases of mind which may be taken as evidence of mental disorder, and be pleaded in remission of punishment on account of criminal acts committed under their influence. The author of the present work has made the study of those conditions his special business, and describes himself, on the title-page, as a physician-expert—"médecin-expert près le tribunal civil de la Seine." He has studied them from a legal point of view as a student of jurisprudence, after having familiarized himself by special observation and experience as a medical man in public and private asylums; he therefore presents his conclusions to us both as a lawyer and a physician.

M. du Saulle introduces his work to fill a hiatus in French medical literature on the medical jurisprudence of insanity. Treatises on this subject are not absent in the English language, but in no one yet published is the matter treated so comprehensively as in the volume before us. To promote greater harmony between the legal and medical professions, the author states that he has endeavoured to unfold to the former profession the history and characteristics of madness and the manifold possible disturbances of the reason, and to initiate the latter in the phraseology and intent of the law and the necessary demands of justice.

As the title implies, the author considers insanity in all its aspects as it comes within the cognizance of the law, and first of all gives a sketch of the Roman law relative to the insane. In the seventeen other chapters he examines, among other matters, the duties of medical experts, the medico-legal relations of lucid intervals, of drunkenness and crime, of somnambulism, hysteria, epilepsy, and erotism, and the value of the evidence of insane persons. In the final chapter he collects the laws and ministerial decrees relating to the insane and asylums now in force in the French empire. It is right also to notice that the validity of wills, as affected by various disordered mental states, and by the disturbances of the mind on the approach of death, or as a result of apoplexy and paralysis, is fully discussed.

In treating the several subjects comprised within the book, Dr. du Saulle borrows illustrations from various sources, appealing to cases on record, and to legal opinions and decisions.

The question of the partial responsibility of the insane has been much mooted of late among French physicians, and we find that M. du Saulle ranges himself on the side of those who would treat many of the insane as partially accountable for their actions. He urges medical men to have the boldness and honesty, when occasion arises, to assert the limits at which a state of partial insanity ceases to be connected with the perpetration of a crime; for by so doing the source of dissension between lawyers and doctors would be removed, and he puts the question whether the indisposition of judges to accept medical testimony in certain cases is not due to the prevalence of exaggerated opinion on the part of the profession.

Some of the chapters are too superficial in the treatment of important topics; for instance, the responsibility of drunkards for crime committed when intoxicated, and the peculiar connexion of pregnancy with insane acts; on the other hand, other chapters are very full and satisfactory, such as that, for example, on the medico-legal relations of epilepsy, and the plan, pursued in that chapter and elsewhere, of giving a summary at the close, is of great convenience and value to the reader.

Although the majority of the cases given by way of illustration are naturally taken from French sources, as better elucidating French jurisprudence, yet several are borrowed from the histories of English trials, and so far bear evidence to the author's wish to perfect his task as far as practicable. However, there are these drawbacks, that the names of English persons and places are sadly mutilated in many instances, and that references are only occasionally given to the reports or treatises from which the cases are quoted.

Upon the whole, we regard this work as a valuable contribution to medical jurisprudence.

ART. XIV.—*On a Form of Bronchitis which is peculiar to certain Branches of the Potting Trade.* A Graduation (Prize) Thesis. By CHARLES PARSONS, M.D.—*Edinburgh*, 1864. pp. 35.

THE subject-matter of this thesis will be new to the members of the profession, other than those in practice in the Potteries, among whom a greater or less acquaintance with it prevails. The disease, however, has never been thoroughly investigated, though of high interest not only pathologically, but also socially, in reference to a large body of artisans engaged in a manufacture of no mean proportions.

Dr. Parsons speaks of the disease amongst potters as similar to the so-called phthisis of knife-grinders, coal-miners, &c.; and without doubt, looking at its causes, a true pathological relationship subsists between them. The potter's bronchitis simulates "tubercular" phthisis, at least it does so in its latest stage; its primary phase being that of "acute, or more commonly sub-acute bronchitis," and its secondary one "that of confirmed chronic bronchitis, with more or less emphysema." At the same time, there is in this potter's consumption, even when most developed, on the one hand, the absence of many of the characteristics of tubercular phthisis, and on the other the existence of symptoms not found in the last-mentioned malady.

The points of resemblance and of difference between the two lesions are well worthy of study, and may be in a great measure gathered from the clinical reports of some cases of potters' bronchitis published in this thesis. We forbear making an analysis of the brochure on account of its accessibility to those interested in its topic; otherwise, there is much ingenious discussion in its pages respecting the causes of the malady, and the character and order of sequence of morbid changes met with, which might be profitably transcribed to these pages. We would therefore commend the thesis to the perusal of our readers, and before concluding this notice of it, mention, by way of appendix, the fact of the recent extension of the operation of the Factory Act to the pottery manufacture; a circumstance which we may anticipate will tend to the improvement of the physical and moral well-being of the potters, and thereby, in course of time, make potters' bronchitis a less prevalent disease.

ART. XV.—*Remarks on Criminal Responsibility in relation to Insanity.* By JOHN A. SYMONDS, M.D., &c. (Pamphlet, pp. 20.) 1864.

THIS is a reprint of an excellent essay read before the Bath and Bristol branch of the British Medical Association in February last, and published in the 'British Medical Journal.' It is one of the results of the agitation and discussion of the Townley case, although that case is only introduced incidentally in illustration of the author's views. It is urged that the jury have to decide whether the criminal act of a prisoner was wilful and malicious, and that medical witnesses are called to give evidence whether the prisoner was disabled by mental disease from knowing that his act was wrong. The divergent principles upon which medical men base their evidence on this point are examined and reduced under three heads. "Delusion," says the author, "must be viewed in connexion with other mental facts before we can arrive at a correct notion of the unsoundness of the mind, and the correlative irresponsibility of its owner;" for it is necessary to prove that a delusion emanates from a diseased mind.

In determining the question, How far does mental unsoundness affect a man's responsibility? Dr. Symonds advocates its being regarded, not simply from the side of insanity, but also "from that of the rights, liberties, and interests of society," and propounds as a test the questions, "Was the criminal under trial a free agent, enjoying all the advantages and privileges of a person at large?" and "Whether the facts testifying to his unsoundness of mind were such as would have justified us in certifying him as a person fit to be confined?" If, in reply to these questions, it be admitted that the accused enjoyed complete personal liberty, and exhibited no such mental unsoundness as would induce the witness to place him under restraint, then, in Dr. Symonds's opinion, he should be held responsible for his actions, except under a few conditions, such as that of impulsive mania; for a consideration of which we must refer the reader to the pamphlet itself.

Another practical point insisted on by the author is worth noting: that it is not our business, as medical men, to say, in courts of law, what is moral, much less legal irresponsibility—

> "Let us declare the man to be sane or insane; if we pronounce him insane, let moralists and legal judges settle the question whether he was responsible for his actions. For my own part, I do not hold that, in the abstract, unsoundness of mind should necessarily, and in all cases, exempt from culpability. Every case must be examined on its own merits; and the questions on which the individual case must turn are, as it seems to me, legal and moral, not medical."

We commend this brochure to the attentive reading of medical men in general, for it discusses "the criminal responsibility of the insane (not as usually done, from the special point of view of lunacy physicians), but under such aspects only as are necessarily presented to all practitioners of medicine."

ART. XVI.—*Ten Years of Operative Surgery in the Provinces: being the Record of* 875 *Operations, performed from* 1850 *to* 1860. By AUGUSTIN PRICHARD, F.R.C.S., Surgeon to the Bristol Infirmary; Lecturer on Surgery at the Bristol Medical School, &c. Part II., comprising *Autoplastic Operations, Excisions, Tumours, and Amputations.—London,* 1863. pp. 293.

THIS, as our readers will observe, is the second small volume which Mr. Prichard has lately published, giving an account of the operations that he has performed during the last ten years. With praiseworthy zeal he has kept a record of his cases, and now he lays them before the profession, not in the dry form of statistical tables, but in the more interesting shape of a series of short and pointed histories.

Part II. contains an account of his autoplastic operations, excisions, tumours, and amputations; and under each of these heads our author details a number of cases. At the end of each section he appends a few "remarks," in which he draws attention to what he considers worthy of notice in the cases that have come before him, in the treatment he has adopted, or in the results he has obtained.

As far as we have observed, there is nothing very new or very striking among the cases recorded in this Part. Mr. Prichard has practised a great variety of operations; among the rest, some which belong to the most modern school of surgery, and he has attained a fair share of success. Like all other surgeons, he has occasionally fallen into mistakes; but these he frankly confesses, and points out as a warning to others.

As a trustworthy record of operation cases, Mr. Prichard's book is very valuable; and we should be glad to see other surgeons follow his example. If those who have the largest experience in operative surgery would furnish us with a similar account of their cases, it would form a basis for statistics of greater value than anything of the kind we at present possess. We should then feel sure that the cases were reported by competent observers; and it is probable that, in many instances, we should be told what was the patient's condition after the lapse of a few years; we should learn how far the operation had stood the test of time. In this way, we should be saved from some of the fallacies into which we are so apt to fall, when we base our conclusions on cases which are reported as soon as the patients are discharged from hospital, and sometimes even sooner.

We commend Mr. Prichard's book to the attention of our readers, as affording an example which is worthy of imitation, and which, if it was extensively and judiciously followed, would probably lead to valuable results in surgical science.

ART. XVII.—*Revista Medica Portugueza.* Anno I. No. 1, *et seq.* *Lisboa*, 1864.

The Portuguese Medical Review. Nos. 1 to 8. pp. 16.

FOR the issue of this bi-monthly periodical we are indebted to certain members of the very numerous staff of the St. José Metropolitan Hospital. Four of their number appear before us as editors. In size of type and paper, the 'Review' has rather the advantage of its more time-honoured compeers, the 'Escholiaste Medico,' and the 'Gazeta da Lisboa.' In these journals of Lusitania we must not expect the fullness of subject nor the severity of tone and method which are found in the best received of our land; but the Portuguese are not without their claims to our attention. Some few cases of ex-ophthalmic goître, related by Dr. Sinas, followed by other three of aortic aneurysm, attended with rupture into the pericardium, from the pen of Professor Sousa, serve in some degree to distinguish the first number of the series; its chief interest to us, however, turns on the position of the University of Coimbra in its relations to the medical profession in Portugal. This forms a standing question before the Chambers, which will inevitably be pushed to its solution. The question is one of privilege, of exclusion and of degrees. At Coimbra alone, in Portugal, can be obtained the degree of bachelor or doctor in medicine; Coimbra is indisputably also the seat of superior education in that country. The medical schools of Lisbon and Oporto, established by authority, with far more ample means of clinical observation, smart under this exclusiveness, and have not been backward in showing their resentment. The hospital at Coimbra is insignificant and insufficient for instruction, the terms of residence at the university are close and continuous, and, as is unquestionably the case, beyond all reason lengthened out in time; moreover, Coimbra has not, like our universities, for its primary object elevation of character by superior studies, but, after a very moderate pass-examination on entrance, the students are trained specially in law, physic, divinity, and applied science, and having this difference in view, Coimbra might, we think, not improperly be considered, in comparison with the excellent medical institutions of Lisbon and Oporto, also in the character of a school. We are too much alive to the mischiefs of professorial, as opposed to clinical, teaching, not to see an error in this display of persistency on the side of privilege. A graceful blending of interests would consolidate the profession in one, while, at present, too many Portuguese have to seek abroad for those honorary titles which might be properly and more conveniently conceded to their worth at home. It would not be amiss if the more tenacious and obdurate of the conservatives would turn their attention to the changes which have been effected in the universities and Royal College of Physicians in this country, extending, as these have done, beyond what was necessitated by external pressure; here the results are apparent in a profession conciliated and attached, and in a vastly heightened prestige accorded to these bodies by the nation. Let Coimbra find a middle path by which ambitious claimants may at once be satisfied, and Coimbra's ancient university fulfil every requirement that can be demanded of a university in Portugal.

In perusal of the following numbers of the Review we notice with much interest the relation of a case of gluteal aneurysm, in which ligature of the internal iliac artery was attempted, but failed from the existence of an anomalous distribution of vessel. The epigastric artery was given off from the front of the hypogastric at a distance of about twenty-five millimetres from the junction of this last with the internal iliac. The epigastric vessel came away at a tangent from the curve pursued by deep pelvic branches, and took its course forwards to the abdominal walls. By the finger during the operation the epigastric at its origin could not possibly be distinguished from the hypogastric artery in which it lost itself. A silk ligature passed round the deep pelvic vessel restrained all pulsation in the tumour; it was accordingly tied. The pulsation returned, however, on the following day. The patient lived but nine days subsequently, falling a victim to repeated hæmorrhages. This particular anomaly of artery is not mentioned in Cruveilher's 'Descriptive Anatomy,' conscientious as he is in instancing such deviations, neither do we find it in Quain's illustrations. When we reflect on the great irregularity which is common in the branches of the internal iliac, the history affords us an additional hint to entertain the proposition of ligaturing the common iliac as being the wiser course in similar cases.

In conclusion, we cannot fail to notice a contribution in the eighth number of a paper on our indigenous genus of serpents, *Vibora*, communicated by the intelligent young naturalist J. V. Barbosa du Bocage, Professor of Comparative Anatomy and Zoology at the Polytechnic School of Lisbon. We learn from him that of the three species known, *V. ammodytes* alone, according to his present experience, is found in Portugal. In Spain, however, the *V. aspis* is to be met with as well as *V. ammodytes*. The *V. pelias*, which affects northern parts of Europe, is well known to be frequent in the Pyrenees, but it seems altogether disinclined to pass that barrier any farther southwards.

ART. XVIII.—*Three Hundred Consultations in Midwifery.* By ROBERT LEE, M.D., F.R.S.—*London*, 1864.

WE do not propose to give an analysis of all these consultations, since from the nature of many it would be impossible to classify all. Premising, however, that there is one class of cases to which we have thought it desirable more especially to direct attention, we enumerate the principal cases in which Dr. Lee's counsel has been sought. They are—Hæmorrhage; placental presentations; convulsions; puerperal mania, peritonitis, uterine phlebitis; preternatural and multiple labours; ruptured uterus; lacerations of the vagina, perinæum, &c.; distortion of the pelvis; lingering labours; craniotomy; evisceration; doubtful pregnancy; tumours; distended bladder; sudden deaths; smallpox and scarlatina in lying-in women; inversion of the uterus; decapitation of fœtus; acephalous fœtus, &c. &c.

The feature in this series which has most forcibly struck us is the very large proportion of cases in which recourse was had to delivery by the perforator and crotchet—and to these we confine our present remarks.

The operation of craniotomy is one from which the obstetric practitioner ordinarily instinctively shrinks, and which he undertakes with only a little less reluctance than he would the Cæsarean operation. There is something appalling in the feeling that the blades of the perforator which you hold in your hand may possibly pierce the cranium, and let out the brains, of a living child. The operator will therefore be slow to come to the conclusion that this formidable proceeding must be had recourse to. There are, however, circumstances under which it may become necessary, in order to save a mother's life, that the condition of the child shall be regarded as a secondary consideration;

but such cases, with due care, will be comparatively rare—the one almost invariable rule being that the death of the fœtus be an ascertained fact before this final step be taken. If it be permitted that this rule be lightly disregarded, practitioners of midwifery would soon come to out-herod Herod in his slaughter of the innocents. To avoid so grave an evil, British obstetric authorities have laid down precise canons for guidance in deciding upon the adoption of craniotomy. Dr. Merriman[1] is exact and explicit on this question, and may be accepted as a most trustworthy exponent of the practice of British obstetricians—

> "The cases," he observes, "which require the perforator are those where the pelvis is so small at the brim, that the child's head cannot pass through it. Other causes do indeed sometimes render the perforator necessary; but the legitimate cause for using this instrument is distortion of the pelvis."

From the latter clause of this extract it is clear that other causes than that of pelvic distortion should form but a limited class of exceptional cases.

Dr. Lee, while recognising the importance of some such canon within the limits of which to restrict the adoption of this operation, yet stretches more widely its circle. Thus, we find it laid down by the author, that "where the child is dead, where a great disproportion exists between its head and the pelvis from any cause, and the os uteri is imperfectly dilated, and the parts swollen and rigid, and an ear cannot be felt, and circumstances occur demanding immediate delivery, recourse must be had to the perforator and not to the forceps."[2] The degree of latitude allowed to himself by Dr. Lee in carrying out this rule in practice may be gathered from the following catalogue of the causes requiring the operation of craniotomy in the 'Three Hundred Consultations' before us:

Lingering labour in	50 cases
Impaction	10 „
Death of child	11 „
Distortion of pelvis	7 „
Hæmorrhage	2 „
Rupture of uterus	5 „
Cicatrices of vagina	7 „
Tumours	4 „
Twin and cross-births	7 „
Mania	1 „
Convulsions	5 „
Hydrocephalus	1 „
Cardiac disease	1 „

The whole number of craniotomy cases was ninety-five out of the three hundred, or 31·06 per cent.

Dr. Collins[3] tells us that out of the large number of 16,654 midwifery cases occurring during seven years at the Dublin Lying-in Hospital, the head was lessened in seventy-nine cases, on account of extreme difficulty in the labour, or where the child was dead. Dr. Collins himself regarded this number to be large, and feels it necessary to offer the following explanation—

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[1] On Difficult Parturition, p. 62. 1826.

[2] Lectures on Midwifery, p. 313. 1844.

[3] A Practical Treatise on Midwifery, by Robert Collins, M.D., p. 486.

> "In this report of the number of children delivered by the crotchet, it is necessary to bear in mind that the proportion of such deliveries is greatly increased in consequence of the *same patient* returning to hospital *two, three*, or even *more* times, in whom, from deformity or other circumstances, such mode of delivery was rendered *unavoidable*."

It is, however, specially noticed by Dr. Collins as "a remarkable fact, that of the examples given of repeated delivery by the crotchet, but *one* of the women died;" thus satisfactorily proving that where death succeeds this operation, the fatal result is not dependent on the mode of delivery, but upon the circumstances demanding such interference. Scarcely an approximate comparison can be made between these two series of cases, as we have no means of ascertaining the percentage of Dr. Lee's craniotomy cases with reference to all others. We find, however, that the mortality is higher in the cases given by Dr. Collins, from which it may probably be inferred that the operation was practised in more extreme cases. In Dr. Lee's report, the deaths of mothers amounted to ten out of the 95 cases, or 10·05 per cent. The causes were as follows:

> "CASE 28.—Curvature of spine and distortion of pelvis; rupture of uterus; had been in labour upwards of forty-eight hours; child dead some days; skin peeling off.
>
> "CASE 75.—Rupture of uterus.
>
> "CASE 78.—I left her with a ghastly countenance, rapid breathing, and feeble pulse. My impression was that she could not live. There could be little doubt the uterus was ruptured.
>
> "CASE 80.—This patient was afterwards cut off by peritonitis.
>
> "CASE 86.—On Oct. 8th, 1851, at 4 P.M. I was requested to see a woman upon whom the operation of turning had been performed, and the head could not be extracted. I was informed that the head and arm had presented; the woman had no pulse, and was moribund. I opened the head in the back part and soon extracted it with the crotchet; she was dead a few minutes after; I thought it would have been better if the operation of craniotomy had been performed when artificial assistance first became necessary.
>
> "CASE 175.—The patient was in the last stage of consumption; pains feeble; labour lingering forty hours. To preserve the patient from dying undelivered, we were compelled immediately to lessen and extract the head. It would have been better if we had done it much earlier, and not given the ergot. (This medicine had been given after the labour had lasted thirty-six hours: no effect).
>
> "CASE 190.—In twenty-four hours all the symptoms of acute peritonitis supervened, and the case terminated fatally. If there was any mistake committed in this case, it was in leaving this patient too long in labour, in the hope of saving the life of the child. (The labour had lasted twenty-nine hours; pains had entirely ceased.)
>
> "CASE 272.—Rupture of vagina.
>
> "CASE 287.—Apoplexy; the head could not be drawn through the rigid os uteri. I spent an hour and a half in the attempt to deliver, but could not succeed, and then the patient was evidently moribund and could not be de-

livered, or her life preserved by any means in our power, and she was left to her fate. She died about two hours after I left.

"CASE 299.—Distorted pelvis; died undelivered."

Of the 79 women delivered by the crotchet in the Dublin Institution, fifteen (19 per cent.), died from the following causes, as given by Dr. Collins:

"No. 173. Stricture of the intestine, with effusion into the thorax. No. 201. Abdominal inflammation *previous* to labour. Nos. 257, 303, 504, from the effects of labour *previous* to admission. No. 665. Puerperal fever, which was at the time prevalent in the hospital. No. 745. Admitted labouring under typhus fever. In the remaining cases death proceeded from the effects of inflammation and hæmorrhage, or injury produced by pressure."

We cannot refrain from expressing regret that the details of Dr. Lee's consultations were not given with greater precision. We have in vain gone through them with the intention of presenting an analysis of the cases of craniotomy with reference to the duration of the labour in each case, as well as the ages of the patients. In many instances the latter point is not at all noticed, while with regard to the duration of the labour we are left uninformed. Even on the all-important question of the death of the child we are frequently left without certain statements in several cases. Hence we cannot but think the value of these clinical reports is greatly lessened.

The antipathy that Dr. Lee has to the use of chloroform in midwifery is well known; it is frequently expressed in this little book—for the most part, however, in such periphrastic form as the following: "The patient was anxious to have a poisonous narcotic to stop the pains." (p. 83.)

ART. XIX.—*Die Pathologie und Therapie der Geisterkrankheiten auf anatomisch-physiologischer Grundlage.* Von J. L. C. SCHROEDER VAN DER KOLK.—*Braunschweig*, 1863. pp. 217.

The Pathology and Treatment of Mental Diseases founded upon Anatomy, Physiology, &c. By J. L. C. SCHROEDER VAN DER KOLK.

THE name of Van der Kolk is familiar to every medical man at all versed in modern physiology and medicine. It brings honour to Holland, his native land, not only on account of his anatomical and physiological researches, but also because he was the prime instrument in raising the condition of the insane from the lowest to the highest point, and in bringing about the construction of asylums which are regarded throughout Europe as models of what such institutions should be.

The present work is a posthumous publication. Its composition was commenced in 1861, was continued, though health failed, and was finally interrupted by death before it could be entirely completed. It is therefore the last and crowning work of this able author and most excellent man, and will secure his fame as a writer on mental disorder, as his well-known physiological papers have done for him as the learned professor of physiology in the University of Utrecht.

Upon the death of Van der Kolk, the honourable duty of placing the treatise before the public was committed to one of his pupils, Dr. Hartsen, whilst the German translation was made by Dr. Theile.

We regard this small work as one of the most valuable contributions to psychological medicine, and particularly so on account of the endeavour made in it to connect disordered mental phenomena with definite pathological conditions—in other words, to place the study of insanity upon a rational pathological basis. That this is the special feature of the treatise is indicated by the fact that of the 217 pages of which it consists, 120 are devoted to an examination of the physiological and pathological anatomy of the brain. The second section of the work is occupied with the pathology and therapeutics of insanity, this malady being considered under two heads, as idiopathic and as sympathetic insanity. In this second portion the principal forms of mental disorder are passed under review, their symptoms and course sketched, and their treatment discussed in a truly practical manner. Moreover, although he has avoided producing a bulky book, he has contrived to give a good outline of those disorders, and to illustrate most of them by well-selected cases.

The physiological portion of the treatise will be read with especial interest, as constituting a brief summary of the latent views of the lamented author on most of the important problems relative to the cerebro-spinal nervous system, and as addressing itself as much to the student of general medicine as to those engaged specially in the subject of mental disorder.

ART. XX.—*Praktiske Bidrag til Kundskaben om Sygdomme i de quindelige Sexualorganer.* Ved Prof. Dr. F. C. FAYE, Overlæge ved Födselsstiftelsen og Börnehospitalet.

Practical Contributions to our Knowledge of Diseases of the Female Sexual Organs. By Prof. Dr. F. C. FAYE, Principal Physician to the Lying-in Institution and Hospital for Children.—*Christiania,* 1864. 8vo, pp. 57.

THE *brochure* before us is devoted to the consideration of fibrous tumours of the uterus. Passing over the author's observations on the nature and development of these structures, we shall confine our attention to a single point connected with them:

> "As it agrees with general experience that fibrous growths advance during the menstrual period of female life, numerous observations, on the other hand, show not only that the development of such tumours may be arrested as age approaches, but even that existing fibroïds, and especially the hypertrophy of the uterine tissue occasioned by them, may be diminished in a remarkable degree. . . . The practically important question, how far fibroïd tumours of the uterus may be absorbed or in great measure disappear during menstrual life, must be looked upon as undecided. At all events, such a result must be set down as very unusual, and as one which can take place only under very favourable circumstances. Scanzoni, who, in his 'Manual of Diseases in the Female Sexual Organs,' expresses the opinion that these tumours are scarcely capable of any radical cure, nevertheless relates that he has observed a case

which points to such a possibility; but in this instance the resolving influence of pregnancy and labour supervened, and gave greater activity to the tendency to absorption. The diagnosis of a fibroïd tumour, as large as a man's head, was said to be quite certain, and the disease had existed for eleven years. Six weeks after delivery no trace of the tumour could be discovered. In my opinion it is probable that this great tumour did not consist exclusively of a fibroïd growth, but that hypertrophy of the uterine substance itself had contributed to its bulk, and thus its rapid retrogression during the involution of the uterus is more easily explained. That the greater vascularity and softening of the parts accompanying pregnancy should, as Scanzoni suggests, suffice in a few weeks to effect, without leaving a trace of it, the resorption of so great a fibroïd, appears to be improbable, when it is recollected how isolated the interior of the tumour is with respect to vascular connexions with the uterus and its absorbent powers dependent thereon, while the tendency to new formation of connective-tissue, and the change of the latter into a still less highly organized cartilaginous substance, is characteristic of the fibroïd development." (pp. 18–23.)

After some further prefatory remarks, the author relates the case of Miss B., aged forty, who had, seven years previously, discovered the existence of a hard tumour in the left side of the abdomen, extending down towards the groin. At the time the patient consulted Prof. Faye the uterus felt, on external examination, like a large, rather hard swelling, somewhat uneven superiorly, occasionally reaching almost to the umbilicus, at other times standing somewhat lower, probably in consequence of the varying position of the uterus during and after movements. The tumour was much more prominent in the left side of the abdomen. Investigation showed that it was probably a fibroïd formation in the substance of the uterus, with a tendency to grow outwards rather than inwards. As operation was out of the question, and as there appeared to be no reason to hope that in its future progress the tumour would develope itself in the cavity of the uterus as a sub-mucous polypus, the author determined to adopt a mode of treatment calculated to produce such modifications of nutrition as are occasionally obtained by the use of certain mineral waters. A mixture of tincture of iodine, liquor arsenicalis, and paregoric elixir was employed internally, and alternated with secale cornutum, a solution of iodide of potassium with the addition of extract of belladonna, and in the interval pills of quina. The daily action of the bowels was insured by the use of infusion of walnut leaves and wormwood, and of dinner pills composed of aloes, iron, and sapo jalapinus. Sedatives were used habitually in the form of paregoric elixir, with morphia and suppositories of extract of opium and belladonna. Wet bandages, and painting with tincture of iodine, were employed externally, alternately with mercurial ointment and extract of belladonna. A bolus of two grains of iodide of potassium with an equal quantity of extract of opium, was introduced into the vagina every or every second day. A douche of tepid water was also employed with the aid of a syringe. Under this treatment, with the use of a mildly nutritious diet, the patient improved, and the tumour became distinctly less. The patient having left Christiania, Professor Faye lost sight of her, but at the expiration of five years from the commencement of the treatment he received, in answer to his inquiries, from her local medical attendant, Hr. Printz, the following report of her state:

> "'Menstruation continued to be regular both during persistence in the treatment and later, since she has begun gradually to feel better. Every month a red discharge, which is often slimy and viscid, so that it can be drawn into threads, occurs during three or four days. About a week after the cessation of each catamenial period a secretion sets in, which at first consists of clear, transparent, coherent masses of various sizes, but afterwards passes into a yellowish, slightly fœtid mucus. This last secretion, which continues three or four days, has occurred regularly since the year 1858, and before the same she still feels, as formerly, some nausea and head-ache, which sensations, however, now rapidly disappear on the occurrence of the secretion and of healthy alvine action, which is in general regular every day. During menstruation the secretion of urine is abundant and clear as water, and at the same time the abdomen becomes somewhat larger and slightly tender to the touch on the left side down towards the groin, where she then seems to be conscious of the existence of a deep-seated tumour. The squeezing sensation which she formerly felt she still observes slightly during the discharge, and she also has some pain in the lumbar region, extending down towards the left thigh, and especially sensible on bending forwards. In the interval of each period she has no pain whatever, neither in standing nor walking, but in the sitting position she finds a certain amount of relief in placing the legs over one another so as to support the abdomen. The quantity of blood lost in menstruation is said to have been diminished since 1858. She is in good condition, has a healthy complexion, and is on the whole so well that she can undertake any work in the house, and field labour in summer, and she can even dance the whole night without any disagreeable sensation." To this report of her present state," continues Professor Faye, "her medical attendant adds the following result of a manual examination immediately after the cessation of the catamenia: 'There was no tumour whatever discoverable in the abdomen, which was not even on strong pressure tender in any part. On internal investigation an even, rather hard tumour is felt, occupying the whole inferior segment of the uterus, which lies rather lower than is normally the case, and fills the pelvis. The patient has not used internal medicines for the last four years, and has also given up the douche, as her health in general has improved.'" (p. 29.)

Upon the foregoing history Professor Faye remarks:

> "I have thought it well to report this case at tolerable length, as its course and the present state of the patient, respecting which after the lapse of many years an opinion can now with some certainty be formed, show that a considerable fibrous tumour in the substance of the uterus has, during the menstrual life of an unmarried woman, disappeared in so remarkable a degree by resorption that complete recovery is scarcely any longer doubtful. Such a result is certainly very rare, and when we read the opinions respecting fibroid tumours expressed in many manuals and monographs, we get on the whole the impression that art can do nothing in cases where the tumour lies in the substance of the uterus, or grows outwards towards the abdominal cavity. Of late years, as I have already said, attention has been specially directed to the use of certain mineral waters, and it is not improbable that repeated courses of such modes of treatment may be attended with advantage." (p. 30.)

The author alludes to the proposal which has been made, and in a few instances carried out, of removing a fibrous tumour situated in the substance of the uterus by operation, referring especially to the successful cases of Dr. Clay, of Manchester, and Professor Koeberle, of Strasburgh. He also devotes a considerable portion of his interesting essay to the subject of the treatment of fibrous intra-uterine polypi, but we have preferred following him at some length in his description of, and remarks upon, the suggestive case above quoted, to laying before our readers a more general review of his book.

ART. XXI.—*Contributions to Practical Medicine and Surgery.* By JAMES ARNOTT, M.D., late Superintending Surgeon at St. Helena. —*London*, 1864. pp. 43.

THESE contributions are very deserving of attention. Like the other writings of the same author, they afford proof of an inquiring and inventive mind, and of research conducted on sound principles. Cold, as a remedial means, is the principal subject treated of, and is comprised in three sections: The 1st. On intense cold or congelation as a means of producing insensibility in surgical diseases. 2nd. On congelation as a remedy in inflammatory diseases, in cancer, and other painful affections, and in epilepsy. 3rd. On its use continuously and uniformly applied of moderate degrees of temperature.

Passing over an objection which might be made to the manner in which Dr. Arnott employs the term cold as if it were an entity, we are of opinion that his statements respecting the use of a reduced temperature in the manner specified by him, whether as an anæsthetic, or in the several diseases enumerated, are well supported by the facts which he adduces. The great facts on which the treatment he recommends seem to rest, are mainly two—viz., that cold checks inflammatory action, and that intense cold, besides being an anæsthetic, is destructive of cell-growth. He very properly does not endeavour to explain the effects, holding that to be vain, and that, as in the instances of many other remedial means, it is most judicious to avoid any hypothetical attempt of the kind. What recommends the cold treatment most, whether for anæsthetic purposes or for subduing inflammation,[1] or as a substitute for the knife, or a substitute for caustic, or in combination with caustic for the removal of cancerous growths, is its safety.

Great merit is due to the author for the methods which he has contrived for employing cold; in this, and in the manner in which he has intended the use of it as a remedy, consist chiefly his claims to originality, and for which we are most indebted to him.

An apparatus which he calls the "current-apparatus" deserves to be generally known, recommended as it is by its simplicity and efficiency. It is described as a thin bladder or membranous bag suitable for holding a small quantity of water of desired temperature, in which a current is established by means of two flexible tubes, an upper one with a stop-cock communicating with a reservoir, a lower one leading to a waste vessel.

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[1] The use of ice in croup is very favourably reported on in the September number of the Journal de Médecine et de Chirurgie. M. de Gran-Boulogne, it is there stated, during the last thirteen years has used no other treatment, and with unfailing success.

We are thus brief in our notice of this portion of Dr. Arnott's contributions from a belief that it deserves and will amply reward a careful perusal, and that it ought, and we would hope will be in extensive demand. And the same remark is applicable to the concluding portion, that in which he treats of diseases of the urinary organs—viz., stricture of the urethra and stone in the bladder, advocating for the former dilatation and eccentric incision, or a combination of the two; and for the latter a modified plan of operation of an analogous kind. His aim is—the great desideratum of the surgeon—the maximum of efficiency with the minimum of risk.

ART. XXII.—*On Combined External and Internal Version.* By J. BRAXTON HICKS, M.D., F.R.S., Lecturer on Midwifery and Diseases of Women, and Assistant-Physician at Guy's Hospital.—*London*, 1864. 8vo, pp. 72.

THE truth of the old saying, that "there is nothing new under the sun," is in a great measure exemplified in the production of Dr. Hicks' little book on combined external and internal version. Not only did Wigand, in 1807, demonstrate that, by means of external pressure applied through the abdominal and uterine walls a certain definite revolution of the fœtus could be accomplished, but so long ago as 1653 we find, in Welsch's translation of an old Italian book (Mercurio: 'La commare draccoglitrice.' Venice, 1604) a tolerably accurate description of this principle. A glimmering of the doctrine existed even in still more ancient times, for at p. 50, in a very old work by Rueff, published at Zurich in 1554, the external grasp of the hand, for the improvement of the position of the child, is spoken of! The two last works appear entirely to have escaped the observation of Dr. Hicks, though he has of course made a just acknowledgment of Wigand's admirable essay, where it is clearly shown that in transverse positions, by means of external manipulation, the long axis of the child can be placed in the long axis of the uterus. Unquestionably this point has not engaged the attention of British practitioners, but it has been long recognised by many German obstetricians. Dr. Hicks has brought the principles alluded to more prominently before the profession in this country, and applies them more universally than has been done hitherto. Regarding Wigand's method and his own modification, the author writes:

> "He noticed, which is indeed the fact, that in the greater number of the so-called transverse presentations the child laid obliquely, not rigidly transverse; that either the head or the breech is nearer the os. He had discovered that pressure upon the exterior would make the fœtus move to a considerable extent; this fact he adapted to the rectification of the abnormal position of the fœtus. He found that, by pressing on both poles of the child in opposite

directions, he could bring that end which was nearest into the os uteri. Thus, as the head was nearest the os in the majority of cases, he more often employed cephalic version. He only employed the inner hand to guide and receive the head or breech into the os. As a motor power it does not appear that he used it; indeed, he particularly directs attention to *outer* manipulations *alone.* This it is important to bear in mind, because in this point consists the difference between being able *merely to rectify abnormal presentations, and being able to accomplish version in any manner; whether partial or complete, podalic or cephalic.* Even where he employed cephalic version (and here the plan to be pointed out in this treatise the nearest corresponds to Wigand's) he did not push back the presenting part in the direction of the feet; and thus, as will be hereafter shown, he was unaware of the advantage to be gained by this procedure."

The mode of operating is described by means of illustrations, without which a good idea cannot be given to the reader. The cases which in Dr. Hicks' estimation are suitable to the employment of the combined version, are malpresentation, convulsions, small pelvis, or other deformity, extreme depression, and placenta prævia. Of the last he says: "If I can feel the membranes and find the head presenting, I then proceed as in an ordinary case before described." Our own impression is, that if the membranes can be easily felt, the preferable plan would be to rupture them and leave the case to nature. The advantages of the peculiar mode of version which he describes are summed up under two heads—first, those of avoidance; secondly, those of acquisition.

"(*a.*) *Avoidance.*

"1. We shall avoid the addition of the hand, and perhaps of the arm, to the uterine contents, with the present and chances of future irritation caused by it.

"2. Entry of air into uterus.

"3. Liability to ruptured uterus, the pressure being opposite to that of the ordinary method.

"4. Much of the pain and distress felt in the ordinary plan.

"5. The necessity of baring the arm, and perhaps the removal of the coat of the operator.

"6. Much of the fatigue and distress felt by the operator by the pressure of the uterus during contractions.

"7. The increase of collapse by the presence of the hand in cases of severe exhaustion.

"I do not wish to lay any more weight upon these points than they deserve. The dangers of cautious turning by the old method are not so great as have been supposed, the unphilosophical deductions from the statistics of this operation having given erroneous results.

"(*b.*) *Of Acquisition.*

"1. We shall gain opportunity of correcting malpresentations as soon as recognised.

"2. The capability of early delivery.

"3. The opportunity of using the child as a compress in placenta prævia.

"4. The capability of version at a time when the old method is impracticable.

"5. The opportunity of producing cephalic version much more readily than formerly."

We think that the author has over-estimated the applicability and advisability of combined version, especially in cases of arm-presentations, where the liquor amnii has escaped any length of time, and in placenta prævia.

Dr. Hicks concludes by giving twenty-four illustrative cases. The last case is one of twins; the second presented with the back. Immediately after the extraction of the first child an examination was made, and another bag of membranes discovered; this was ruptured, but Dr. Hicks adds that he was unable to effect the delivery of the second child for some time, owing to a *very rigid* os uteri, which was only the size of a five-shilling piece! We are somewhat at a loss to understand how such a condition of the os uteri could be possible immediately after the extraction of a full-sized child, with a twin still in utero.

Dr. Hicks has certainly done some good in bringing before the profession the advantages of combined external and internal version, but we cannot help expressing a hope that his next literary production will be written with greater care.

ART. XXIII.—*A Companion to the British Pharmacopœia; comparing the Strength of the various Preparations with those of London, Edinburgh, and Dublin, United States, and other Foreign Pharmacopœias, &c.* By PETER SQUIRE, F.L.S., Chemist on the Establishment of the Queen, &c. Second Edition.—*London*, 1864. pp. 256.

THE rapidity with which the former edition of this work has been disposed of is perhaps the best indication of its merit. The new edition, however, possesses qualities which render it really much more useful and handy than its predecessor. The entire work has apparently been revised with much care, necessary corrections have been made, and necessary additions contributed. Much new matter refers to preparations which are "not officinal," and all such are distinctively and clearly indicated. The description of the various drugs contains a statement of their preparations and doses, and a full index exists, combined with a table of the doses, so that in this index, by the use of Italic and Roman letters, the eye seizes at a glance the name of the preparation, its dose, the page at which it is described in the volume, and the fact whether it is in the 'British Pharmacopœia,' or not officinal. Altogether the work is almost a necessary complement to the new 'Pharmacopœia' as it at present exists.

PART THIRD.

Original Communications.

Art. I.

On the Presumption of Survivorship.[1] By James Bell Pettigrew, M.D. Edin., Assistant in the Museum of the Royal College of Surgeons of England, Extraordinary Member and late President of the Royal Medical Society of Edinburgh, late Resident Surgeon to the Clinical Surgical Wards of the Royal Infirmary of Edinburgh.

SYNOPSIS.

The phrase "presumption of survivorship" considered in its nature and bearings.—The laws framed for the regulation of questions of survivorship traced and commented upon.—The scarcity of said laws, particularly in Britain.—The demand which exists for a carefully drawn-up code, as proved by the uncertainty of the issue of cases of survivorship.—Outline of a new code of laws for settling the more obscure forms of survivorship.—Questions of survivorship resolvable into such as pertain to individuals lost by common accident, and where mother and child die during parturition.—The weight to be attached to the testimony of medical and other witnesses in questions of survivorship in the present state of science.—The fallaciousness in numerous instances of such testimony, and the demand which arises for direct proof or positive law.—The value of physical and other signs in determining questions of survivorship.—The chances of survivorship in death by parturition, by wounds, by suffocation, by starvation, by cold, by sun-stroke, by lightning, and by burning.—Recapitulation.

Introductory Remarks—the phrase "Presumption of Survivorship" considered.

In treating of the many obscure medico-legal points involved in questions of survivorship, an arrangement differing widely from that adopted in the occasional chapters dedicated to this subject in works on forensic medicine, has been resorted to; partly with a view to classifying and arranging existing knowledge, and partly for the purpose of opening up new sources of information.

Although the question of survivorship is admitted on all hands to be one of extreme importance, there is unfortunately, from the unavoidable absence of competent witnesses during the last moments of those concerning whom it is raised, more or less difficulty always experienced in its solution. Indeed this want of positive or direct evidence in determining which of two or more related by birth or otherwise, perished first, is fully embodied in the phrase "presumption of survivorship," as generally received; for the word presumption, which is derived from two Latin words—*prae* (before), and *sumo* (to take up)—means, in its literal acceptation, supposition as opposed to what admits of demonstration—in other words, it implies a judging before, or hastily, or when the premises are of such a nature as not fully to warrant the conclusion. The term "presumption," moreover, as used by the lawyer and medical jurist, admits of various shades of meaning, and may be construed to signify "possible," "barely possible," "probable," or "very probable;" and indeed, as far as this is concerned, much will depend on the plausibility and scientific acumen of the person by whom the term is employed.

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[1] The subjoined paper obtained the Medical Jurisprudence Gold Medal in the University of Edinburgh in the summer of 1860.

This adaptability, if one may so express it, of the word presumption in the phrase "presumption of survivorship," seriously interferes with the dispensation of justice, it usually happening that not more deference is paid to the merits of the case, than to the ability and zeal of the counsel;[1] a circumstance, which while it opens up a wide field for the honourable exhibition of various kinds of learning, leaves, it is to be feared, a broad margin for the successful display of mere ingenuity. The laxity of the materials with which the medical jurist has to do in questions of survivorship, has, it is to be regretted, hitherto forbidden our having any very positive law on the subject—a want alike perplexing to the legal adviser, and the client whose claims it is his duty to advance. As, however, the determination of such cases may be a matter of great moment to surviving relatives, who may win or lose a position and fortune thereby, it merits the serious consideration of legislators. The difficulty to be experienced in framing a law or laws which shall so nicely meet the emergencies of every case as to be equally binding on all, will be readily admitted; but that British law would receive a most important accession in the adoption of certain Continental tenets which long use has sanctioned, if not approved, is equally certain.

If proof were wanting of this assertion, it is to be found in the feuds of surviving relatives and the uncertainty of the issue of cases of survivorship in the best hands.[2]

The Laws framed for the Regulation of Questions of Survivorship traced and commented upon.

The ancient Romans, with their usual forethought, had a just conception of the necessity of positive law, in questions of survivorship; and in order that their sagacity may be contrasted with our own improvidence in this matter, and because their civil code formed the basis for all succeeding codes, it will be necessary briefly to advert to it before proceeding to enumerate the laws of more modern nations. "According to the civil law, for example,[3] which generally regulates the administration of personalty, it is held that when parent, whether father[1] or mother,[2] and child perish together, as in shipwreck, if the child be of the age of puberty he shall be presumed to have survived; but on the contrary, that he died first if he were under that age, regard being also had to the relation of the party who is to benefit by the decision. It may, however, happen in several ways[3] that the mother may perish under the ruins of a building sooner than the child whom she suckles; it may happen that a son may be killed in battle before his father; and on the same occasion, and likewise in all others, it may so fall out that they both die at the same instant,[4] or that even he who by reason of his age or some other infirmity might be presumed to die first does nevertheless die the last;"—all which probabilities clearly demonstrate the necessity for ascertaining and fixing upon such law or laws as shall fairly meet the majority of cases: arbitrary to a certain extent they necessarily will be, but time and the experience which time begets would naturally tend to strengthen and consolidate a system founded on liberal and comprehensive principles.

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[1] See the admirable and plausible reasoning of Fearne in his 'Arguments in the Case of the Representatives of General Stanwix,' in which he pleads with great ability on both sides of the same question. (Fearne's Posthumous Works. London, 1797.)

[2] Vide cases of General Stanwix, Colonel James, and others, as given in Philip's Reports, Fearne's Posthumous Works, &c.

[3] Domat. C. L., pp. 652, 653.

The spirit of the Roman law, says Beck,[5] guided the decisions of the Continental tribunals for many ages; and Zacchias,[6] in his elaborate discussions on this question, cites cases from several jurisconsults which were settled according to the dicta of the civil code. The ancient French law took for the most part after the Roman; i.e., it supposed the husband as surviving the wife, the son the father, if he had arrived at the age of maturity, and the reverse if he was still a minor: it was consequently open to the same objections as the civil. It, however, made a curious provision in cases where testator and legatee perished together, adjudicating the property in such instances to the heirs of the testator himself; inasmuch as, according to it, a man must have heirs, though not necessarily legatees.[7]

With a view to remedying the felt defects of previous enactments, the present French law as set forth in the "Code Napoléon" was framed. It runs as follows, and although by no means perfect, is greatly to be preferred to anything yet existing:—

> "I. If several persons, naturally heirs of each other, perish by the same event, without the possibility of knowing which died first, the presumption of survivorship shall be determined by the circumstances of the case, and in default thereof by strength of age and of sex.
>
> "II. If those who perish together were under fifteen years, the oldest shall be presumed the survivor.
>
> "III. If they were above sixty years, the youngest shall be presumed the survivor.

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[1] Cum bello pater filio perisset, materque filii quasi postea mortui bona vindicaret, agnati vero patris, quasi filius ante perisset, Divus Hadrianus credidit patrem prius mortuum. Dig., Lib. 34, T. 5, 5, 9, S. 1, de Rebus dubiis.

[2] Cum pubere filio mater naufragio periit; cum explorari non possit, uter prior extinctus sit, humanus est credere filius diutius vixisse; l. c. lex 22.

[3] Domat. p. 651.

[4] See improbability of this occurrence as argued by Fearne in his Posthumous Works, p. 42.

[5] Beck's Elements of Med. Jur., London, 1825, p. 211.

[6] Zacchias, vol. i. pp. 440, 441.

[7] Foderè, vol. ii. p. 221.

"IV. If some were under fifteen and others above sixty, the former shall be presumed the survivors.

"V. If those who had perished together had completed the age of fifteen, and were under sixty, the male shall be presumed the survivor where ages are equal, or where the difference does not exceed one year.

"VI. If they were of the same sex, that presumption shall be admitted which opens up the succession in the order of nature; of course the younger shall be considered to have survived the elder."[1]

In Section I. of the foregoing Code it will be observed that such cases as can be determined by collateral or circumstantial evidence, are left to turn upon their own merits; while those which cannot be so determined are to be settled according to strength of age and of sex, the conditions of which are explained in Sections II., III., IV., V., and VI. Thus, in Sections II. and III., by a process of exclusion, provision is made for all those who perish under the age of fifteen and above sixty—a wise arrangement, when age becomes the concomitant of much tenderness, and includes alike the infant at the breast and the old man in his dotage. The fourth section—viz., that which adjudges the survivorship to those under fifteen, when they and persons above sixty perish together—is not so happy; for, as was justly pointed out by Foderè,[2] it makes no distinction between the endurance of infants of one, two, and three years, and men of sixty-one, sixty-two, and sixty-three, whose age and experience would certainly entitle them to live the longest. Section V., which regulates the chances of survivorship in the male and female between the ages of fifteen and sixty, appears to me likewise faulty; for it does not state which is to be adjudged survivor when the difference greatly exceeds one year—the probability being that a robust female of twenty or twenty-four would survive a delicate male of fifty-nine.

On the whole, the Code Napoléon is a very admirable one; and the frequency with which it has been quoted by other nations in their decisions upon questions of survivorship, proves at once its importance and the high esteem in which it has all along been held. Paris[3] suggests that in disposing of questions of survivorship, where no direct evidence is forthcoming, the order of nature should be followed; and "that it should be presumed the child survived the parent, the nephew the uncle, descendants ascendants, legatees testators, and generally that the younger had outlived the elder." But that something more definite is requisite will be evident from the following circumstance: if the order of nature were followed in all cases, then the sister or daughter of two years, might be regarded as surviving the brother of twenty, or the father of forty years, which is a manifest absurdity.

Scarcity of Positive Law in Cases of Survivorship, particularly in Britain.

Although, as far as I am aware, there is no separate code of laws in

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[1] Code Napoléon, Titre 1er des Successions, chap. i. § 6, p. 270, &c.

[2] Foderè, vol. ii. pp. 223 to 226.

[3] Med. Jur., by J. A. Paris, M.D., &c. London, 1823, p. 392.

Britain for settling the actual question of survivorship, many provisions have been made which immediately come into operation when that is determined. Thus, in 'Blackstone's Commentaries,'[1] it is stated: "If a man be seized in fee of lands and tenements, *though but for a moment*, his wife is entitled to dower;[2] therefore, if both father and son perish by a common accident, and the son survive—*however short the period*—his wife shall have dower, for the lands descended *the instant the father died*." A curious illustration, cited by Paris,[3] occurred in the case of Broughton *v.* Randall.[4] On this occasion father and son, being joint-tenants, were hung in the same cart. The son struggled the longest,[5] in consequence of which he became seized of an estate in fee by survivorship, and his widow had a verdict granted for her dower accordingly. The same provision extends also to partners and others where the interest of the deceased lapses to the survivor. In such cases, the heirs of the survivor become entitled at his death. So also of testator and legatee. When the latter dies first, it is a lapsed legacy, and falls into the residue; when, however, the legatee survives, his executors claim.[6] According to the law of England, a man marrying a woman possessed of freehold property, if it be not specially settled by marriage articles, has no claim upon it after the death of his wife, unless he has a child by her capable of inheriting the estate,[7] born during the life of the mother, and which has survived for a longer or shorter period. If, however, a child be so born, the husband retains the property during his life as tenant by courtesy.[8]

An example of the application of this law is to be found in the case of Fish *v.* Palmer, tried in the Court of Exchequer at Westminster Hall in 1806, in which, although the child was nominally still-born, the jury, in virtue of some tremulous motion of the lips—a very precarious sign of life certainly[9]—returned a verdict in favour of the plaintiff.[1] The vagueness of this law, and the consequent temptation to *evade it altogether*, was ludicrously shown by a person of the name of Bowes,[2] who caused the bells of the town to be rung at the birth of a still-born child as if for a son and heir. Fortunately for the ends of justice, he was not able to substantiate the imposture. In Scotland the law bearing upon survivorship is more exact, for Lord Stair in his 'Institutes' lays it down that "the children of the marriage must attain that maturity as *to be heard to cry or weep;*" and adds that "the law hath well fixed the maturity of the children by the *crying or weeping*, and hath not left it to the conjecture of witnesses whether the child was ripe or not." A case of this kind, entitled Dobie *v.* Richardson, was tried in the Court of Session in 1765. In this instance the child breathed, raised one eyelid, and showed other symptoms of life for half an hour. As, however, the child *was not heard to cry*, and the mother died within a year and a day after the marriage, it was decided the husband was not entitled.[3] It may be as well to mention here that the Roman law regarding the maturity of the child was equally strict, and that according to it, it was necessary for the child, in order to inherit, to be perfectly alive, "si vivus perfectè natus est."[4] Zacchias says, "Non nasci, et natum mori, paria sunt." Dagobert ordained that in France the infant *should live an hour, and be able to see the four walls and ceiling of the chamber*. This edict was revoked by Louis IX., who held it sufficient *if the child cried*.[5] The present French law[6] directs that in order to succeed the *infant must be born alive*.[7] And in order to receive by testament, it is sufficient to have been conceived at the time of the death of the testator; but neither donation nor testament can have effect unless the child *be born alive*. A more intricate, and not less important question, and one which has considerably perplexed foreign jurists,[8] is, whether a child which has been delivered by the Cæsarean section may inherit. According to the law of England a child so born does not entitle its father to be tenant by courtesy.[9]

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[1] 2 Bl. Com. 132.
[2] Vide Park on Dower.
[3] Cro. Eliz., 502.

[4] Med. Jur., by J. A. Paris, M.D., &c., and J. S. Fonblanque, Esq., Barrister-at-law. London, 1823, p. 390.

[5] In Noy, 64, it is stated the father moved his feet after the death of the son.

[6] Vide Mason v. Mason (Merivale's Chancery Reports, vol. i. p. 308), and Taylor v. Deplock (Philip's Chancery Reports, vol. ii. p. 281).

[7] i.e., a male, if entailed.

[8] Tenant by the curtesie of England is where a man taketh a wife seized in fee simple or fee taile general, or seized as heir in taile especial, and hath issue by the same wife, male or female, born alive (oyes ou vife), albeit the issue after dieth or liveth, yet if the wife dies the husband shall hold the land during his life by the law of England, and he is called tenant by the curtesie of England, because this is used in no other realme but in England only (this law prevails also in Scotland and Ireland, Co. Litt. 30); and some have said that he shall not be tenant by the curtesie unless the childe which he hath by his wife be heard crie (Coke says if it be born alive it is sufficient, though it be not heard to cry, for peradventure it may be born dumb, (Coke Litt., 30 A), for by the crie it proved that the child was born alive (Har. Coke Litt., p. 29, chap. 4, sect. 25). Blackstone (vol. ii. p. 127) says that, although the crying of the infant is the *strongest* evidence of its being born alive, it is not the *only* evidence; and Fitzherbert was of the same opinion. Vide case in Dyer's Reports, p. 25; and Paine's in 8th Coke's Reports, p. 207.

[9] Dr. Denman, Foderè, and others very properly object to twitching as a sign of vitality, it being in numerous instances a mere result of muscular contractility. As a case in point, see that of Mattia Bracci, in Zacchias, Capuron, &c. It may, how-

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ever, happen that a child pronounced still-born may not really be so (see Manual of Jurisprudence, by Michael Ryan, M.D., &c. London, 1837, p. 156).

[1] For fuller account of this case, see p. 184 of this paper.

[2] Vide Jesse Foot's Life of Mr. Bowes.

[3] See a note to Dyer's Reports, 25, by the editor, John Vaillant, A.M., &c.

[4] Codex de posthumis.

[5] Capuron, p. 198.

[6] Civil Code, Articles 725 and 906.

[7] By being born alive, according to the best authorities, is meant complete and perfect respiration. Vide Capuron, p. 199.

[8] Illud autem valde controversam est inter jurisconsultos, an is qui editus est execto matris ventre reputetur partus naturalis et legitimus et successionis capax. (Caranza, de Partu Naturali et Legitimo, p. 427.)

[9] The issue must be born during the life of the mother; for if the mother dies in labour, and the Cæsarean operation is performed, the husband in this case shall not be tenant by the curtesy; because at the instant of the mother's death he was clearly not entitled as having no issue born, but the land descended to the child while he was yet in his mother's womb; and the estate being once so vested, shall not afterwards be taken from him (Blackstone, vol. ii. p. 127). Further, "if a woman seized of lands in fee taketh husband, and by him is bigge with childe, and in her travell dieth, and the childe is ripped out of her body alive, yet shall he not be tenant by the curtesie, because the childe was not borne during the marriage, nor in the life of the wife; but in the meantime her land descended, and in pleading he must allege

According, however, to the Court of Sancta Rosa at Rome,[1] and in a recent case in France (1780), children so delivered were recognised as viable,[2] and consequently entitled to the benefits accruing from survivorship. The only remaining question to which it is necessary to allude in this place is that which pertains to monstrosity, for monsters also may survive their parents. The English law on this subject is thus stated:[3] "A monster which hath not the shape of mankind, but in any part evidently bears the resemblance of the brute creation, hath no inheritable blood, and cannot be heir to any land, albeit it be brought forth in marriage; but although it hath deformity in any part of its body, yet if it hath human shape it may be an heir.[4] Here again, although the meaning of the law is very obvious, the want of precision in the wording, renders it liable to misinterpretation; for the question immediately arises, what is a monster? This of course is a primary difficulty, and would require to be settled before the laws regulating the descent of property could come into play.

The Demand which exists in Britain for Positive Law in Cases of Survivorship as proved by the uncertainty of their Issue.

Having briefly enumerated the laws bearing upon questions of survivorship in various countries, and having shown the paucity and vagueness of British law, it will be necessary to consider, by way of illustration, a few of the more celebrated cases of survivorship; a perusal of such cases alone conveying an adequate conception of the question as it now stands, and a knowledge of them being essential to the framing of new laws for their regulation. On taking a comprehensive view of the cases of survivorship scattered throughout the judicial reports of this and other countries, they are found to resolve themselves into two principal forms, viz., *such as pertain to individuals lost by common accident,* as shipwreck, conflagration, the falling of tenements, &c., *and those which relate to mother and child when they die during parturition.*

As an example of the first, the case of General Stanwix may be cited. In 1772 this gentleman, in company with his wife and daughter, set sail from Ireland for England. The vessel in which they sailed was wrecked, and all on board perished. On behalf of a nephew who would

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that he had issue during the marriage (Co. Litt., 29). In illustration, see Paine's case, 8th Coke's Reports.

[1] Foderè, vol. ii. p. 163.

[2] See opinion of Pelletan on a case of this kind, vol. i. pp. 322 to 341.

[3] If the wife be delivered of a monster which hath not the shape of mankind, this is no issue in the law; but although the issue hath some deformity in any part of his body, yet if he hath human shape this sufficeth. "Hi qui contra formam humani generis converso more procreantur (ut si mulier monstrosum vel prodigiosum fuerit enixa) inter liberos non computentur. Partus tamen cui natura aliquantulum ampliaverit vel diminuerit non tamen superabundanter, ut si sex digitos vel nisi quatuor habuerit, bene debet inter liberos commemorari. Si inutilia natura reddidit membra, ut si curvus fuerit aut gibbosus vel membra tortuosa habuerit, non tamen est partus monstrosus. Hermaphrodita tam masculo quam fœminæ comparatur secundum prevalescentiam sexûs incalescentis" (Co. Litt., p. 29).

[4] Blackstone, vol. ii. p. 246.

have become entitled if the survivorship of the General could have been proved, it was argued that the General, as a man of courage and accustomed to danger, in all probability outlived his wife and daughter —a circumstance rendered the more likely from the probability of his being on deck when the vessel foundered, while his wife and daughter, with characteristic timidity, would be in the cabin, and consequently liable to perish first. On behalf of the representative of the daughter (a maternal uncle) it was argued that as she was young, and consequently unwilling to part with life, while the General was old, and therefore ill prepared to battle with the storm, the chances of survivorship were greatly in favour of the daughter. The representative of the wife lodged a separate claim; and the Court finding the arguments equally solid and ingenious on all sides, advised a compromise, which was agreed to.[1] This case, which seems to have set at nought every principle of judicial decision, affords a remarkable example of the equilibrium which may obtain between dissimilar probabilities. The rougher sex, age (and consequent debility) of the General, contrasted with the gentler sex, youth (and consequent hardihood) of the daughter, and the one negatived the other. It therefore seems to be a case requiring the interference of positive law, and illustrates very forcibly the objection stated to Section V. of the Code Napoléon. This section, it will be remembered, makes provision for individuals of different sexes who perish between the ages of fifteen and sixty, when the ages are equal, or where the difference does not exceed one year; but leaves the question wholly undetermined when the period greatly exceeds a year. A case resembling the foregoing in many respects is that of Job Taylor, quarter-master sergeant in the Royal Artillery. Taylor, it appears, had been in Portugal on foreign service, and was returning to England with his wife Lucy Taylor, whom he had appointed by his will as his sole executrix and sole residuary legatee. The vessel in which they sailed struck on a reef in Falmouth harbour, and upwards of two hundred, among whom was Taylor and his spouse, perished. Taylor died possessed of property to the amount of 4000*l.* A bill in Chancery was filed by the next of kin of the wife against those of the husband, but no personal representative of the latter appearing, the case for a time was at a stand. Shortly after the contending parties mutually applied for a limited administration, which being refused by the Court on the plea that it could not be given where a general one might be obtained if applied for, the question came ultimately to be as to whom the general administration should be granted; whether to the relatives of the husband as dying intestate, *his wife not having survived* so as to become entitled under his will, or the representatives of his wife as his residuary legatee, *she having survived* so as to become entitled under that character. From evidence adduced it appeared that a short time prior to the vessel going to pieces, Lucy Taylor was in the cabin while the husband was on deck; that being resolved if possible to save his wife, Taylor had offered large sums to such as would descend to the cabin and rescue her from the impending danger, but that, finding no response, he resolutely descended himself, and so perished. The bodies of the husband and wife were found close together. But as it further appeared in evidence that Lucy was of a robust constitution, and accustomed to endure much fatigue in the management of the officers' mess, while her husband was sickly and latterly much affected with asthma, the question of survivorship became one rather difficult of determination. On the part of the husband's relatives it was contended that the case should be decided according to the Roman law, which supposes the father and mother as surviving their offspring, if they are still minors, *the husband the wife*, and so on; and that such a decision would be in accordance with established precedent and the known fact that the wife was in the cabin when the accident happened, and probably perished before the husband reached her. On the part of the representatives of the wife it was urged that the wife, being the stronger of the two, the order of nature was in this particular instance reversed; and both having perished by a common calamity, that she consequently was entitled to the doubt. Sir John Nicholl, who sat on the case, drew a distinction between residuary legatees and heirs-at-law, and showed that the representatives of the wife not being residuary legatees themselves, were consequently one step further from the property; the rule in such cases being that the presumption of law was in favour of the heir-at-law with regard to freehold, *and equally so of the next of kin with regard to personal property*, the Statute of Distributions disposing of an intestate's property among his next relatives solely on the presumption that such was his intention, unless the contrary should be expressed. The representatives of the daughter, on whom the burden of the proof rested, being unable to convince the Court of the survivorship of the wife, the administration was accordingly granted to the husband's next of kin.[1] This case forms a curious illustration of the old French law already quoted (p. 203), which declares that while a man must have heirs, he need not necessarily have legatees; and that on such occasions, where the testator and legatee perish together without the possibility of knowing which survived, the effects of the former should always pass to his next of kin. This case is illustrative in another respect as showing the necessity for defining by positive law the conditions of age, sex, and strength, and the great weight which may be attached to collateral evidence when any purpose is to be served by it. The representatives of the wife commended her robust constitution and admitted hardihood, and deprecated the chances of the sickly and asthmatic husband; while the representatives of the husband, on the other hand, laid particular emphasis on the fact of his being on deck when the accident happened, and on his being a man of arms, inured to danger, and not likely to forget himself in such a crisis. Independently, however, of special pleading, considerable importance must be attached to the position of individuals in a common calamity; and if Taylor had remained on deck instead of going below to the rescue of his wife, the chances of survivorship would have been greatly in his favour. In cases of shipwreck, e.g., when the vessel goes aground on a sandy coast, and the wife, daughter, or mother is found in the cabin, and consequently submerged, while the husband, son, or father is found lashed to the mast above water, the probability is that the latter died gradually from fatigue and exposure, while the former met an instantaneous death. A case in point occurred within my own knowledge. Two boys were drowned by falling into an old shaft in their attempts to gather brambles at its edge. The elder of the two was known to be an expert swimmer, and when the bodies were discovered that of the elder was found placed above that of the younger. In addition, the arms and legs of the elder boy were found discoloured and lacerated, which discolorations and lacerations were no doubt produced in his attempts to prolong existence. Another instance, in which there would have been little difficulty in determining the survivor, occurred in the west of Scotland within the last few years. A band of boys, seven in number, were amusing themselves on their return from school by sliding on a pond adjoining the road. The ice gave way, and all perished. The sad event told its own tale, for on the disappearance of the boys a search was instituted, and a slight fall of snow being on the ground, enabled the searchers to trace the footsteps of the boys from the school to the margin of the pond. Arrived there, a recently-formed slide was discovered which extended from the margin for some distance into the pond, at the end of which was a large irregular opening in the ice. The satchels and other incumbrances of the boys were found strewed around, and pointed significantly to the yawning abyss at the end of the slide. Further search only tended to confirm the worst fears of the searchers, for the bodies of the spirited but unfortunate boys were found piled the one above the other in its treacherous waters. A case of a similar nature occurred at Dunbar within the last three years. An English family had gone to the coast for the purpose of sea-bathing. One of the daughters while enjoying that luxury had gone beyond her depth, and her sister seeing her sinking and hearing her shrieks, rushed to her assistance. They were both immediately in the same sad dilemma. The father and brother, who were walking on the beach and saw the accident, instantly rushed to the spot. The brother instinctively hastened to the rescue of his sisters, but being unable to keep himself afloat, it was evident that all three were fast perishing. The tragedy craved yet another victim, for the father, unable in his despair to profit by the sad warnings he was receiving, also plunged to the fatal rescue. Here, then, there was a sequence in the order of death; and if a question of survivorship had arisen, little difficulty would have been experienced in determining it. Of a like nature in the order of events was the melancholy accident which occurred in the Theatre Royal of Glasgow in 1849. In this calamity sixty-two perished, and in this wise: an alarm of fire was raised, and, as usual in such cases, all rushed to the door. The door was unfortunately closed, and as the long narrow passage leading thereto was literally choked with panic-stricken individuals eager to avoid an imaginary danger, suffocation and pressure soon began their deadly work. The alarm was discovered to be false, and as the manager saw no reason for abruptly terminating the performance, the acting was resumed. At length, however, the appalling fact of the fatal passage became known; and on the outside door being forced, it was found that those next to it—i.e., those who had suffered most from back and therefore accumulated pressure, and who consequently experienced the suffocating effects most intensely—were for the most part dead; while the deaths became fewer and fewer in proportion as the passage was cleared and as the interior of the theatre was reached; thus proving that the presumption of survivorship was in favour of those farthest away from the door.

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[1] Vide Fearne's Posthumous Works, p. 37, where elaborate and skilful arguments are advanced on either side.

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[1] Taylor and others v. Deplock.

Somewhat similar in results are cases of accidental death from choke-damp, of which I have known many in the mining districts of Lanarkshire, Scotland. Those who perish first are invariably those farthest removed from the air-passages—and who consequently are nearest the point of concentration. But I need not multiply examples; suffice it to say that there is a certain class of cases in which the position of the body would go far to establish the claim of survivorship, and in which (for the circumstances are reversible) if the said position were in favour of the mother, the daughter, or the wife, instead of the father, the son, and the husband, the order of nature might fairly be considered as reversed, and the benefits resulting from survivorship awarded to the former.

A notable example of this state of things occurred in France in the seventeenth century. A mother (Dobie) and her two children, the one aged eight years and the other twenty-two months, were murdered secretly in the night. The husband claimed the property of his wife on the ground that *the children had survived the parent.* The parliament adjudged it to him on the plea that the murderers would naturally first destroy the person from whom most resistance was to be expected, which of course would be the mother.[1]

A strictly analogous case, related by the celebrated advocate Ricard, occurred about the same time. "In 1658 a father and son fell in the famous battle of Dunes. On that same day, and at the very hour the battle commenced, the daughter and sister took the veil, whereby she became *dead in the law*" (here the order of nature was reversed in virtue of taking the vow). The question arose, which of the three survived? It was determined according to the principle of the Roman law, and the doubt was given in favour of the son, who had arrived at maturity, and for this reason. The daughter died in an instant, her vow being voluntary; while the father and son, in all probability, struggled for some time on account of their wounds, in which struggle the son, in virtue of his youth and strength, most likely prevailed.

For further information on these and analogous points, see several cases related by Zacchias in his 'Consilia;' the case of Colonel James and his wife, as given by Paris;[2] the case of the merchant, his wife and daughter, quoted by Beck from Foderè;[1] and the case of Mason *v.* Mason, in Merivale's Chancery Reports.[2]

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[1] Causes Célèbres, quoted by Foderé, vol. ii. p. 218.

[2] Medical Jurisprudence, by J. A. Paris, M.D, &c., and J. S. M. Fonblanque, Esq. London, 1823, vol. i. p. 389.

Of the second class of cases—viz., *such as involve the death of mother and child during delivery*—are the following:

In the seventeenth century the imperial chamber of Wetzlar was consulted concerning a mother and child who had died during labour several years previously. No evidence was forthcoming, and they decided for physical reasons that the child had survived the mother; but as the causæ physicæ are unfortunately not given, we are left in ignorance as to their real nature. They were, probably, however, as suggested by a commentator on the case[3]—1, that the mother was exhausted by the labour, and sank; and 2, that the child died after her for lack of nourishment. The justice of the foregoing decision has been questioned by several medical jurists,[4] for, say they, the child may and is likely to have died first from various causes; such, for example, as protracted labour, labour complicated with convulsions, child unusually large or before its time, pressure on the umbilical cord, partial detachment of the placenta inducing fatal hæmorrhage, &c. &c., all of which are by no means uncommon; while the chances against the mother are comparatively few. Indeed, in the case in question only two have been suggested—viz., when the mother is being delivered of twins, and dies after the birth of the first, and before the birth of the second; and when she is labouring under an acute disease. Another very similar case is related by Beck,[5] on the authority of the Hon. De Witt Clinton. The case was tried in the American courts, and involved the succession to a large landed estate. The mother and child both died during delivery. If the latter was found to have survived, the father was heir; if the former, the relatives. On the trial it was proved that the child was born alive, and the question of the priority of death was then decided against the parties claiming as heirs of the mother. In this case, of course, the *presumption* of survivorship was set aside *by the proof* of the child's being born alive.

A very good example of disputed survivorship of mother and child is that of Fish *v.* Palmer alluded to in p. 177. This case occurred in 1806, and was tried in the Court of Exchequer, Westminster Hall. Fish had a still-born child by his wife, and at her death resigned the estate to his wife's brother-in-law. Some circumstances afterwards occurred to induce him to bring this action, and to attempt to prove that the child was not born dead. Dr. Lyon (deceased at the time of trial) had declared an hour before the birth that the child was alive; and having directed a warm bath to be prepared, gave the child when born to be immersed in the warm water. It did not cry, or move, or show any symptoms of life; but while in the water (according to the testimony of two women) there twice appeared a twitching and tremulous motion of the lips. Upon informing Dr. Lyon of this, he directed them to blow into its throat, but it never exhibited any other sign of life. Drs. Babington and Haughton agreed that the muscular motion of the lips could not have happened if the vital principle had been quite extinct, and that, therefore, the child was alive. Dr. Denman, on the contrary, gave it as his opinion that the child was not alive. He drew a distinction between uterine and extra-uterine life, and thought that the remains of the former might have produced the twitching of the lips. The jury found that the child was born alive; but according to Foderè, who quotes the case, the twitching was no evidence of vitality.[1]

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[1] Foderè, vol. ii. pp. 220, 316.

[2] Merivale's Chancery Reports, vol. i. p. 308.

[3] Valentini's Pandects, vol. i. pp. 3, 11.

[4] See remarks thereon by Capuron (La Médecine relative à l'Art des Accouchements, à Paris, 1821, p. 135); Belloc (Médecine Légale); and Suc (Journal de la Société de Médecine de Paris, tome viii.).

[5] Elements of Med. Jur., by T. R. Beck, M.D. London, 1825.

The Weight to be attached to the Testimony of Medical and other Witnesses in Questions of Survivorship, in the Present State of Science.

Such are a few of the more characteristic cases of the two principal forms of survivorship; and it only remains briefly to consider those physiological and pathological laws which, when taken in conjunction with the physical signs naturally resulting from their operation, are, in the absence of direct proof, the only ones left to the medical and scientific world for the elucidation of truth and the triumph of right over wrong. On these laws and their concomitant signs, however, as will be pointed out, no very great reliance can as yet be placed; for such are the discrepancies in the opinions of authors equally familiar with their principles, that it often becomes a question who is to be believed. Those discrepancies arise from the difficulty of rightly interpreting nature in her various phases, and will no doubt gradually disappear as science advances; but in the meantime, as far as mere opinion goes, it will be well to receive the statements of professional and other witnesses with a certain degree of caution. While, however, implicit reliance cannot be placed in scientific evidence in obscure points, little reasoning would be required to show, that as a whole, even in its most incoherent forms, it is greatly to be preferred to that furnished by mere ingenuity.

The Value of Physical and other Signs in determining Questions of Survivorship.

On making a hasty analysis of the physiological and pathological laws adverted to, they will be found to resolve themselves into—

1. *Such as regulate life in its various forms;* and
2. *Such as regulate death in its principal varieties.*

Under the first will naturally be considered the conditions of body depending upon age and sex; while under the second will be included the various kinds of death by which two or more may perish within a short period of each other, and the means to be taken in ascertaining

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ciples of For. Med., by J. G. Smith, M.D., London, 1821, p. 384.

who first succumbed to the destroying element. With regard to age, it may and has been variously estimated. Aristotle, e.g., divided life into three portions—viz., the period of *growth*, the period during which the body remains *stationary*, and that of *decline;* while Varro divided it into five, and Solon into ten. Hippocrates and the greater number of the ancients adopted a septenary division, and this division has been almost universally adhered to in modern times. Thus *the period of growth is made to include*—Infancy (Infantia), Second Infancy or Boyhood (Pueritia), and Adolescence (Adolescentia); *the period during which the body undergoes little change*—Youth (Juventus) and Manhood (Ætas virilis); *and the period of decline*—Old Age and Decrepitude. Infancy, as commonly estimated, extends from the first to the seventh year; Second Infancy, or Boyhood, from the seventh to the fourteenth year; Adolescence, from the fourteenth to the seventeenth or eighteenth year; Youth, from the seventeenth or eighteenth year to the twenty-first, or, more properly, the twenty-fifth; Manhood, from the time the powers corporeal and mental are fully matured until old age and decrepitude supervene. As the epochs which comprise the sum total of existence insensibly glide into each other, it has appeared to me that in framing rules for the regulation of questions of survivorship, we shall gain precision by reducing the epochs to the lowest possible number—i.e., by fixing on such periods only, as are characterized by obvious and well-marked mental and bodily changes. With this object in view, I have, on reflection, divided life into four great eras. The first, *which embraces Infancy and Childhood*, extending from the first to the fourteenth year, a period characterized by great bodily development; the second, *comprising Adolescence and Youth*, and extending from the fourteenth to the twenty-fifth year, at which latter period the body may be considered as having attained its full stature;[1] the third, *including Manhood*, and extending from the twenty-fifth to the fifty-fifth, or, it may be in some instances to the sixtieth year, which era may be said to comprehend the substance of man's mental and bodily activity; and the fourth or last era, *embracing Old age and Decrepitude*, when the body may be considered as gradually giving way. This period, I may remark, forms the converse of Infancy and Childhood, when the body rapidly developes.

Outline of a New Code of Laws for deciding Questions of Survivorship where Males and Females perish by themselves.

A. As far as infancy and childhood are concerned, the elder may fairly be presumed the survivor whatever the mode of death, and for the following reasons: the strength and power of endurance will be greater, while the instinct which prompts to the preservation of life will be more fully developed.

B. From the fourteenth to the twenty-fifth year the same rule will apply, as the activity of the elder will equal that of the younger, while reason will combine with instinct in making attempts at self-preservation more effectual.

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[1] Quetelet thinks this does not happen till the twenty-seventh year.

C. In manhood—that is, from the twenty-fifth to the fifty-fifth or sixtieth year—the presumption of survivorship ought to be reversed—in other words, it should be in favour of the younger, as possessing as much strength and greater activity in preserving life, while the love for it will not be less.

D. When the individuals perishing are above sixty, the same rule seems to be equally applicable, and for the like reasons.

E. When, however, those who perish are above sixty and under fourteen, the presumption of survivorship ought to be in favour of the aged up till the sixty-seventh year, after which it should be in favour of the young—i.e., the old male or female of sixty-one, sixty-three, sixty-five, and sixty-seven, will in all probability outlive the young male or female of one, three, five, and seven respectively; while the child of eight, ten, twelve, and fourteen, will most likely survive the adult of sixty-eight, seventy, seventy-two, and seventy-four. The first clause of this provision proceeds on the assumption that the endurance of the very aged and very young being about equal, the presumption of survivorship will be in favour of the former on account of experience; while the second clause takes for granted that the child of eight has more vital energy than the adult of sixty-eight, and therefore most likely to survive—a circumstance favoured, moreover, by the order of nature.

Outline of a New Code of Laws for Regulating Questions of Survivorship where Males and Females perish together.

A. When children under fourteen of different sexes, and of the same age, perish together, the female ought to be considered the survivor, as being up till this period the more apt; but when the difference exceeds two years, the elder should be considered the survivor, whatever the sex.

B. When adults above sixty, of different sexes, perish together, the male should be considered the survivor, as retaining his bodily powers longer, while his intellect decays more slowly.

C. When the persons are above fourteen and under sixty, and of different sexes, the male appears to be entitled to the survivorship when the difference does not exceed ten years, both on account of his superior strength and greater familiarity with the external world.

D. When the difference exceeds ten years, the female, under certain circumstances, may be considered the survivor. (See case of General Stanwix, &c., p. 179.)

The foregoing rules, although strictly arbitrary, are, it may be remarked, founded on periods or intervals of time which in the human body produce well-marked physiological differences as regards the power of endurance, strength of intellect, and other qualities. They do not, however, lay any pretension to completeness beyond what is attainable by arbitrary rules in general; and I may state in apology, that they have been drawn up rather with a view to show what might be done in this direction, than from the most distant prospect or hope of my succeeding in such an undertaking.

The great difficulty of framing rules for the regulation of unexpected and sudden emergencies has been already adverted to; but the circumstance seems to make a virtue of necessity, and to invite us to settle by positive law what otherwise must apparently remain undetermined. Beck,[1] when speaking of this, says "that no one will doubt the propriety, and indeed the necessity, of positive law in questions of survivorship;" and Guy[2] expresses a similar belief in the words: "That an enactment extending to that large class of cases in which the circumstances of the death are but imperfectly known, and those in which it is, from the very nature of things, impossible to come to a correct decision, is certainly much to be desired." In order that the difficulty and the necessity of framing laws may appear in their full importance, it is only requisite to consider the multiplicity of deaths for which they are called upon to provide, and the dissimilarity of opinions regarding the duration of life in different individuals perishing by a common calamity. This branch of our subject will be most successfully treated under the following heads—viz., Death by Parturition, by Wounds, by Suffocation, by Starvation, by Cold, by Heat, by Lightning, and by Burning. And first:

Death by Parturition.—This form of death has been already so fully treated in the foregoing pages that the annexed extract from Mr. Guy's[3] admirable work will suffice:

> "In the case of mother and child both dying in childbed, *the presumption is that the mother survived*; for there is a prima facie probability of a still birth, and a still greater probability that a woman perishing in childbed will not be able to render to her child the assistance necessary for its preservation.
>
> "It is probable, therefore, *that the death of the child would precede that of the mother*. A large child would be still more likely to perish first. If there is an opportunity of examining the body, the presumption may be still further strengthened by the external marks of a difficult labour, or the absence of the signs of respiration."

Death by Wounds.—Under this head would naturally be recorded lesions of all kinds; but as they are infinite in variety, the consideration of them must be left to those intrusted with the examination of the case, as the probability of survivorship can only be determined by their nature and extent.

Death by Suffocation.—The term "suffocation" is a very general one, and may include smothering, hanging, drowning, noxious inhalation, fatal intoxication, and a great proportion of poisoning. It is used when death supervenes from impeded respiration; as, in smothering occasioned by the fall of embankments and buildings, in drowning resulting from boat accidents and shipwrecks, in asphyxia caused by the fatal inhalation of noxious vapours, such as arise from burning charcoal, lime, fermenting liquors, putrescent sewers, and places where there is little or no interchange of fresh air, as old wells long closed, vaults, cellars, caverns, and the like.

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[1] Elements of Med. Jur., by T. R. Beck, M.D., &c. London, 1825, p. 218.

[2] Principles of For. Med., by W. A. Guy, M.B., &c. London, 1844, p. 311.

[3] Principles of For. Med., by W. A. Guy, M.D., &c., p. 309.

Death by Smothering.—When several individuals perish by smothering, and the question arises, who survived? a variety of circumstances ought to be taken into account—as the respective ages of the deceased, their sex, mode of life, strength; but, above all, the position of the bodies when found, and the marks of external violence thereon. Death by smothering, which is caused by the forcible closing of the mouth and nose in whatever way, while not uncommon, is one in which it is exceedingly difficult to arrive at a correct diagnosis as regards survivorship; for when, as often happens, an embankment gives way or a house falls, death for the most part appears in such a formidable shape as all but completely to set aside those post-mortem and other appearances which in the majority of instances prove so eminently serviceable. A case in point occurred in Glasgow in 1849. A large sugar-warehouse, situated in Alston-street, was suddenly destroyed as follows. A rise was expected in the price of sugar, and the firm to whom the establishment belonged, thinking to profit thereby, bought up and incautiously stowed on the second floor of the building, innumerable large hogsheads of the said material. The floor thus immoderately strained, gave way, and in so doing pushed out the sides of the building, causing its utter demolition. The men who were employed on the premises at the time were of course involved, and it was found on removing the rubbish, with a view to saving such as still survived, that death, as a rule, prevailed in proportion as the *débris* was cleared away—in other words, those who had been at the top of the building, and who consequently were supplied with a certain amount of fresh air, escaped with more or less severe injuries; while those employed in the second and ground floors were, with few exceptions, found dead. The subject of one of the exceptions, according to his own account, had been struck down by a falling beam, which, resting at an angle above him, at once protected him from descending splinters and the deplorable effects of suffocation. A curious analogous case is quoted by Beck.[1] A number of individuals perished by the fall of a building, and among them a father aged sixty, and his son aged thirty. The bodies were found ten hours after the accident. That of the father was uninjured, but on the head of the son there was a severe wound. The heirs of each put forth their claims, and Zacchias was consulted on the case. After a long comparison between the strength and state of health of the parties, he came to the conclusion that the son survived the father. Being aware, however, that the wound in question was supposed to have accelerated the death of the son, he endeavours to avoid the difficulty by suggesting that it was not necessarily mortal, nor of a nature to destroy his strength immediately; while the suffocation was so much the more urgent cause of death, that the father, from his valetudinarian state and his advanced age, would be first destroyed by it. The soundness of this opinion was controverted by Foderè,[1] and with considerable show of justice; for certainly a wound of the head, and of so severe a nature, may safely be considered the most sudden destroyer of life under the circumstances.

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[1] Elements of Med. Jur., by T. R. Beck, M.D., &c. London, 1825, pp. 211 212.

In the case of the sugar-refinery, of course the differences of age, sex, and strength would have been set aside by the nature of the calamity, and the proofs of the presumption of survivorship must have rested exclusively on the position and bodily condition of the sufferers when found.[2] The same reasoning will apply to the falling of embankments where stones or projecting boulders might afford a temporary safety. Death by smothering often occurs when persons of a weakly frame, or those addicted to intemperance, fall with their faces on the ground, or get into positions from whence they are unable to extricate themselves, and when children and others are overlaid. Here again position is the chief indicator. The notorious Burke and his associates, in addition to forcibly closing the mouth and nostrils of their unfortunate victims, pressed their whole weight violently upon their chests, and thus hastened death. In these cases, according to the testimony of Dr. Christison, it would have been exceedingly difficult to determine the mode of death by post-mortem appearances alone.

Death by Hanging.—See curious and illustrative case of hanging at p. 177 of the present paper.

Death by Drowning.—This form of death is perhaps of all kinds of accidental death at once the most common and complete. It arises under a variety of circumstances, and seems steadily to increase with civilization and the desire to extend our acquaintance of men and things. Dr. Desgranges has suggested that drowning may occur in two ways—viz., by nervous or syncopal asphyxia, and asphyxia by suffocation; to which Dr. Marc has added a third—viz., asphyxia from cerebral congestion. As these several modes involve differences as regards time, and are characterized by diagnostic signs peculiar to each, it is of importance to allude to them in this place, as being likely to prove of some value in the determination of questions of survivorship. In drowning by *nervous* or *syncopal asphyxia* the skin is characterized by great paleness, the result, as is thought, of spasm of the cutaneous vessels. Here, fear, the chill of the water, an attack of hysteria, or an accidental blow on the head in falling, suspends, as it were, the vital functions, and throws the nervous system into a state of inaction. Persons drowned under these circumstances generally survive much longer than those drowned by either of the other modes, as is proved by the following remarkable case:

A young woman was condemned to be drowned for the crime of infanticide. On being immersed she fainted, and although a quarter of an hour had elapsed from the time of her submersion she nevertheless recovered on being taken out.[1]

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[1] Vol. ii. pp. 320, 321.

[2] Guy says that in suffocation from the falling of houses or earth, or by mechanical means in general, the stronger may be presumed to survive the weaker—men women, adults children and old persons. (Principles of For. Med., by W. A. Guy, M.B. &c. London, 1844, p. 310.)

In the second kind of drowning, viz., *asphyxia by suffocation*, the individual perishing is not at once rendered insensible by shock or otherwise, but makes vain endeavours to respire, the consequence of which is that a quantity of water enters the trachea and mixes with the air in the bronchia to form the frothy mucus so commonly perceived in drowned persons—the lungs in such cases being totally unable to perform their functions. Here of course the probability of survivorship is not so great as in drowning by nervous or syncopal asphyxia. In the third kind of drowning, viz., that by *asphyxia from cerebral congestion*, the persons most likely to suffer by it are those of an apoplectic habit, addicted to intemperance and the luxuries of the table. This species of drowning is characterized by lividity and swelling of the countenance.[2]

On these various modes of drowning, however, and their attendant signs, no very great reliance can be placed; for paleness of the skin may result from inanition, froth at the mouth from epilepsy, and swelling and lividity of the countenance from apoplexy, all of which might occur prior to immersion. The post-mortem appearances may perhaps be considered more satisfactory. On opening the heads of persons who have perished by syncopal asphyxia little or no engorgement of the blood-vessels, as a rule, is found; which is just the reverse of the appearance presented when death ensues from cerebral congestion.[3]

With regard to the frothy mucus found in the trachea and bronchia there is considerable difference of opinion; some authors, as Becker,[4] Littre, Senac, and Petit, denying that its presence is necessary in any form of drowning whatever; while others, as Haller, De Haen,[1] and Louis,[2] affirm that it is. Recent investigation inclines to the opinion of Becker and his followers, although Foderè[3] thinks the presence of frothy mucus may be considered as a sign of asphyxia. That, however, frothy mucus even when present is not an infallible sign, is at once evident from the fact, that it may occur in death resulting from strangulation, from epilepsy, from violent catarrhal affections, and from breathing noxious vapours. The foregoing appearances are of course only valuable when the bodies are recovered soon after death and before putrefaction sets in. Another diagnostic sign of survivorship is when sand, mud, and other materials are discovered beneath the nails, and something or other is found clutched in the hands as denoting a struggle; but here again appearances are deceptive, for the sand and mud may have got beneath the nails by the rubbing of the body on the bottom, and the hands may have grasped the substance they contain, while the individual was in the act of falling into the water. A difficulty which may arise in cases of drowning, and which is often debated in medico-legal circles, is whether the persons found in the water have not been made away with beforehand; but as this is very improbable, where questions of survivorship are likely to be raised, it need not be discussed.[4]

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[1] Quoted from Plater by Foderè (Médecine Légale, vol. iii. p. 85). A case is given in Sir B. Brodie's Lectures on Pathology and Surgery, in which recovery was obtained after a submersion of five minutes. According to the Rev. Mr. Corder and Dr. Lefevre the time occupied in the perilous exploits of the pearl and sponge divers varies from one to two minutes, but never exceeds the latter. (Wharton and Stille's Med. Jur., pp. 634, 5).

[2] To these three forms of drowning others of a mixed nature might be added. Dr. Mare says that suffocation and apoplexy may act reciprocally either as the essential or aggravating cause of death. Devergie thinks drowning may be fatal in five ways, viz., by simple asphyxia, by syncope, by cerebral commotion, by apoplexy, by a mixture of these causes in which the functions of the brain, the lungs, and the heart are simultaneously suspended. Death by asphyxia, joined with syncope or cerebral congestion, he considered the most common, and comprehends five-eighths of all drowned—death by simple asphyxia being less frequent, and in the ratio of one to four; while death from syncope, from simple cerebral congestion, commotion of the brain, or apoplexy, still less rare and in one to eight. In the first kind of death, viz., asphyxia joined with syncope or cerebral congestion, the post-mortem appearances are a little water and froth in the trachea and bronchia; while in the second, viz., that by simple asphyxia, froth and water are found in the trachea and bronchi (Médecine Légale). See also Dr. Wright's Prize Essay written in 1840. He recognises four kinds of asphyxia—the common syncopal asphyxia, apoplectic asphyxia, and nervous asphyxia.

[3] Goodwin states, in opposition, that the vessels in cerebral congestion are not turgid, but that the brain itself is of a darker hue externally, while the right side of the heart is full, and the left side half full of black blood. Enquiry, p. 415.

[4] J. C. Beckeri Paradoxum Medico-Legale de submersorum morte, sine pota aqua, 1704, published in the Novellae of Valentini, p. 299. See also Phil. Trans., vol. xxiv. p. 2512. Also Memoirs of Literature, vol. iv. p. 165.

On calmly reviewing the foregoing diagnostic marks, in connexion with the modifications to which they are subject, their inconclusiveness in matters of survivorship must be at once conceded. They can therefore only form part of the evidence in the settlement of such questions, a fact tending to strengthen a former line of argument, viz., the importance to be attached to collateral circumstances, as age,[5] sex, strength, position of the bodies, &c.

Death by Noxious Inhalation.—Death occasioned by the breathing of impure vapours, although by no means so common as death by drowning, is nevertheless so frequent as to demand a large share of attention.

Perhaps the most common cause of death by this means, is the breathing of air deprived of its oxygen, the air being surcharged with carbonic acid gas, as happens when a large concourse of people are violently forced into a small and imperfectly ventilated compartment, and locked up for a considerable space. A most melancholy example of this occurred in 1756, at Calcutta, on the surrender of Fort William to the Viceroy of Bengal. On this occasion 145 men and 1 woman, were barbarously thrust into a small prison, measuring eighteen feet by fourteen, and ventilated merely by two barricaded apertures. Here they remained for the protracted period of ten hours, and when liberated 23 only of the 146 survived.[1]

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[1] De Haen's Ratio Medendi continuata, 130, &c.

[2] Louis, sur les Noyes.

[3] Foderè, vol. iii. pp. 73-94.

[4] In such cases the presence of external marks of violence will in general give a clue to the real state of things. In examining these, however, care should be taken that such marks are not the result of and occasioned after death, rather than the cause thereof.

[5] Guy, in speaking of the probabilities of survivorship afforded by age and sex under the head of 'Drowning,' says that in shipwrecks men are more likely to be in a favourable situation for saving themselves, as they are more on deck than women; they also in many instances are able to swim, or to save themselves by clinging to portions of the wreck, and they are less incumbered by clothing. When the comparison is made between men similarly exposed, and capable of the same exertion, it may be necessary to inquire whether one was more exposed to cold by having the body half immersed, whilst the other was more under water; search should also be made for severe injuries which may have prevented the swimmer from using his strength. Death from apoplexy is stated by Devergie to be sooner fatal than by apnœa, while in death by syncope there is the best chance of recovery. Principles of Forensic Medicine, by W. A. Guy, M.A., &c. Lond. 1844, p. 310.

Another example, illustrating the same pernicious effects, though not to such a frightful extent, occurred a few years earlier in London, viz., in 1742. The scene of this atrocity was a place called the Hole —a part of St. Martin's Round House. The persons incarcerated were 20 in number, of whom several died during the night.[2]

In deaths produced by an imperfect supply of oxygen, the question of survivorship is somewhat difficult of determination. Those possessing large muscular development, although they have great strength and are consequently likely to exert it in obtaining the best places, or where most pure air is to be had, are on this very account liable to suffer as early as the others; for the demand for oxygen being in proportion to the muscular exertion, it follows that if they do exert themselves, they lose by violence what they would gain by being quiet,[3] and are thus reduced to the condition of weaker individuals. Guy[4] on this point says :—

> "Females consume less oxygen than men; the same quantity of air therefore will last them for a longer time. Hence of adult males and females perishing together of apnœa, the females may be presumed to have survived. In poisoning by carbonic acid gas, which is nearly allied to death by apnœa, the chances of survivorship are with the female. This statement rests upon the authority of a large number of facts. In 19 out of 360 cases of asphyxia by carbonic acid, which took place in Paris during 1834 and 1835, in which a man and woman were asphyxiated together, 3 only were saved, *and these 3 were females*. In solitary cases of the same form of death, the result is also favourable to the female; for as many as 18 out of 73 females have been restored, whereas the number of restorations in males amounted only to 19 in 83. The proportion therefore of those recovered from poisoning by carbonic acid gas is, as nearly as possible, 15 females to 14 males. Devergie[5] states it to be 5 females to 4 males, but in this he is in error."

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[1] For an account of this horrible barbarity, see a pamphlet entitled, "A genuine narrative of the deplorable deaths of the English gentleman and others who were suffocated in the black-hole of Fort William, &c.," by J. Z. Holwell, himself chief of the party.

[2] For further examples of poisoning by carbonic acid gas, see Professor Trail's Outlines of Medical Jurisprudence, p. 128.

[3] Lavoisier states that a man under ordinary circumstances consumes 1300 or 1400 cubic inches of oxygen in an hour, but if he be engaged in raising weights the consumption is at the rate of 3200 in an hour.

[4] Prin. of For. Med., by W. A. Guy, M.B., Lond. 1844, pp. 309, 310.

[5] Devergie, Médecine Légale, Art. Survie.

Beck and Sardaillon furnish illustrative examples :—

"A man and his wife were exposed in a small room to the gas from the live coals. The man was found dead, rigid, and contracted, *but the woman was still breathing and recovered.* A man, his wife and their child, aged 7 years, were asphyxiated in a porter's lodge. The child died, the father was very ill, and with difficulty restored to life, while *the wife was well enough to call for help and to assist both husband and child.*"

In these cases it would be necessary to take into account the position which the parties occupied in the room, whether on the bed or on the floor, near or remote from the window, &c. In further treating of poisoning by carbonic acid gas, Guy is of opinion that "in all cases of suffocation depending on an insufficient quantity of air, or upon air rendered partially unfit for respiration, it may be presumed that those who require least air live the longest—women than men, children[1] than adults."

Another variety of poisoning by carbonic acid gas occurs when the atmosphere is vitiated by charcoal or limestone fumes, as happens when individuals incautiously close the doors and windows of apartments containing stoves with burning charcoal,[2] or trust themselves in the vicinity of lime-kilns. It is moreover for the most part owing to the evolution of large quantities of carbonic acid gas, that the atmosphere of vaults, cellars, caverns, wells,[3] and dungeons, is as a rule so pernicious.

The post-mortem appearances presented by those who suffer from the deadly effects of carbonic acid gas, are, head, face, and neck swollen; eyes projecting, tongue protruding, swollen, and inclined to one side of the mouth ; jaws closed, face livid, lips of a dark blue colour ; abdomen inflated, body warm, and limbs flexible for hours after death ;[4] head and lungs, particularly the right side of the heart, gorged with black fluid blood ; epiglottis always elevated,[5] muscles soft and readily torn.

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[1] Paris (Med. Jur., p. 55) gives a contrary opinion, and the case quoted by Mr. Guy himself from M. Sardaillon is opposed to this doctrine. See additional case in Edin. An. Rg., vol. vi. part 2, p. 64.

[2] The fumes of burning charcoal consist principally of carbonic acid gas, and carbonic oxide. Carbonic acid gas is contained in the exhalations from lime-kilns and cellars where wine, beer, or other liquids are in a state of ferment. This gas is frequently produced in wells, marshes, and mines. In the latter, however, a different substance is also generated, called the fire-damp, or carburetted hydrogen gas, which is no less deadly. But the frequency of fatal accidents to persons descending wells is to be ascribed to carbonic acid (El. of Med. Jur., by Beck, p. 278).

[3] Carburetted hydrogen of various qualities is given out by stagnant waters. It is one of the results of combination, and is abundantly produced in coal-mines where it is the formidable fire-damp. When the atmosphere is much contaminated with it, it opposes the breathing and produces headaches and giddiness. When mixed in the proportion of $\frac{1}{12}$ with the atmosphere of mines it will explode on the approach of a flame ; yet in such an atmosphere persons will continue to work for some time with impunity. But even if there be no risk of explosion, the narcotic effects of the gas begin to be perceived in those long exposed to it. Outlines of Medical Jurisprudence, by Thomas Stuart Trail, M.D., &c., Edinburgh, 1857, p. 126.

[4] Struse, p. 52. Billoc, p. 184-5. See also history of three cases by Dr. King in the Edin. Med. and Surg. Journ., vol. vii. p. 80.

[5] Portal in Medical Commentaries, vol. iii. p. 254. Billoc, p. 184. Medico-Chirurg. Transactions, vol. i. p. 93. Orfila, vol. ii. p. 347. Larry, vol. ii. p. 128.

These post-mortem appearances, though frequent, are not invariable,[1] and even when present by no means proof positive that the person died from noxious inhalation, inasmuch as many of them are common to other kinds of death.[2]

In questions of survivorship, therefore, arising from death by noxious inhalation, there is a double difficulty; for it will be necessary *to ascertain first* whether the individuals have actually died through its agency, *and secondly* who died first. To determine the first point it will be requisite to examine the state of the atmosphere in which the bodies are found, although even this may prove fallacious owing to the noxious vapours having escaped from the entrance made by the individuals themselves; and to determine the second, the position of the bodies when discovered should be carefully noted. Those nearest the entrance are almost certain to have survived the longest, whether male or female, unless in the case of children, who possibly might sink sooner than adults of either sex, even in that situation. A little latitude might also probably be allowed to thoracic capacity, and the healthy or unhealthy state of the lungs.

Death by various other forms of noxious inhalation, such as that produced by mercurial vapours,[3] sulphuretted[4] and carburetted hydrogen gas,[5] chlorine,[6] sulphurous acid gas, &c., might be enumerated, but as these are, comparatively speaking, very rare, and by no means likely to involve the question at issue, they may be passed over in silence.

Death by Poisoning.—Death occasioned by poisoning is analogous in many respects to death resulting from noxious inhalations. It occurs in such a variety of forms as would render a detailed account of any one of them inconsistent with the object of the present paper. As, however, the subject is too important to be altogether omitted, I purpose treating it very generally, referring for particulars to the many admirable treatises already existing in our own and other languages. As far as the question of survivorship is concerned, poisoning may very conveniently be divided into:—

Such as arises through Negligence and Accident, and

Such as is the result of Forethought and Design.

Of the former are cases of poisoning occasioned by the carelessness of the individuals themselves,[1] by the culinary mistakes of the household,[2] by indulging in delicacies out of season,[3] by substituting poisonous fruits, fungi, &c., for wholesome ones which they resemble,[4] and by the peculiarities of idiosyncrasy.[5]

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[1] In some cases many of these signs are wanting, and in others some are reversed; thus the face is occasionally pale.

[2] The phenomena witnessed in death by drowning, by hanging, and various other violent deaths, simulate the foregoing appearances in many respects.

[3] See effects of in his Majesty's ship Triumph as related by Paris in his vol. ii. p. 460. Also results produced at the Royal Manufactory of Looking-glasses in Berlin, p. 459.

[4] According to Thenard and Dupuytren it is sufficient that the air contains 1-3000th of sulphuretted hydrogen in order to kill a bird in a very little time; that which contained 1-800th produced death in a dog of middle size; and a horse died in an atmosphere containing 1-250th part of it. (Orfila, vol. ii. p. 371.) See also cases recorded by Paris, vol. i. pp. 100–102.

[5] Vide Sir Humphrey Davy's Researches, Chemical and Philosophical, chiefly concerning nitrous oxide, &c., London, 1800.

[6] Recherches de Physiologie et de Chimie, p. 144 an. 1811. Lond. Med. and Phy. Journal for November, 1821.

Of the latter kind are wholesale poisonings (an endless variety), such as not unfrequently happen at the feasts of kinsmen, and others where contending claims and the order of succession in noble and wealthy families prove a strong temptation to younger members and immediate relatives.[6]

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[1] Parties often take poisonous substances unawares; thus oxalic acid is sometimes mistaken for the sulphate of magnesia, arsenic for cream of tartar, &c.

[2] Vicat relates the case of a family who took some soup in which the root of white hellebore had been put instead of pepper. Beck (Med. Jur., p. 521) gives the case of eleven French prisoners who gathered by mistake, near the town of Pembroke, a small quantity of hemlock dropwort (Ananthe Crocata) and ate it with bread and butter. Two of the number died after being violently convulsed. The foregoing case is quoted by Orfila, vol. ii. p. 242. Some soldiers partook of broth into which hemlock had been put. All of them were shortly after seized with pains in the head and throat, and felt as if drunk, from which they recovered. One, however, who had eaten more than the others, died. Schubert, the celebrated musician, together with his family (one child excepted), a friend, and a physician who dined along with him, were all poisoned by a dish of mushrooms. (Paris, vol. ii. p. 428.)

[3] Beck says that symptoms the most violent and uncommon often occur in individuals who live in a luxurious manner and eat mushrooms, truffles, and shell fish out of season—i.e., in peculiar seasons of the year (Elements of Med. Jur., by J. R. Beck, M.D., &c., Lond. 1825, p. 366). A case from poisonous effects of a crab supervening within fifteen minutes after eating it, is mentioned in the New York Medical Report, vol. xii. p. 189. And Dr. Burrows gives an account of two boys who died from eating small mussels picked from the sides of a fishing-smack in a dead and tainted condition (Med. Rep. vol. iii. p. 445).

[4] M. Gaultier de Claubray, a medical officer, mentions a case of a detachment of French soldiers, several hundreds in number, halting a short distance from Perna, near Dresden, who being allured by the inviting appearance of the berries of atropa belladonna (deadly nightshade), ate freely of them. One hundred and eighty of the men were poisoned, of whom several died before medical assistance could be had in sufficient strength. Dr. Baxter states that in 1765, when some of the British troops, under Sir John St. Clair, were stationed in the vicinity of Elizabeth Town, near Jersey, three of the soldiers collected a quantity of datura stramonium (thorn apple), which they mistook for lamb's quarters (chenopodium album), and dressed and ate it. One of them became furious and ran about like a madman, while a second was seized with genuine tetanus and died. (Burton's Med. and Phy. Jur., vol. i. p. 146.)

[5] Dr. John Gordon Smith speaks of a person who was always purged if he took opium, and of another who suffered the most excruciating torments if he partook of anything into the composition of which an egg had entered (Smith's For. Med., p. 65). Fordyer relates the case of a woman who was subject to cholics for 30 years in consequence of having once taken an infusion of the pulp of colocynth prepared with beer, and Schinkens relates a case in which the general law of astringents and cathartics was always reversed.

[6] In ancient times see poisoning of Drusus at the instigation of Sejanus (Taciti Annal., lib. iv. c. 8), and also Livy's account (Lib. viii. c. 18) of the frequency of poisoning 200 years or so before the Christian era, wherein it is mentioned that upwards of 150 ladies of the first families in Rome were convicted and punished for preparing and distributing poisons. Also Tacitus' account of the poisoning of the Emperor Claudius and Britannicus the son of Agrippina by Locusta (Tac. An. 13 s. 15–16). In modern times see account of the diabolical Tophana, as given in Labut's travels through Italy and Beckman's history of inventions. This monster prior to execution in 1709 confessed to having destroyed upwards of 600 individuals. See also an account of her infamous pupils *Spara* the Sicilian, and *Margaret d'Aubray*, Marchioness de Brinvilliers,

As, however, in this last class of cases the assassins would naturally take especial pains to secure the death of their victims precisely as they wished, and scrupulously observe the time of their decease, it follows that they need not be taken into consideration, as the certainty of the event sets the presumption of survivorship completely aside. As moreover the utmost ingenuity was and is still expended in the composition of the love philtre, "poudre de succession," &c., as it has been significantly termed; it so happens that by excluding the entire mass of occult poisoning (and the foregoing considerations fairly entitle us), we at once get rid of many of the difficulties of a most extensive and perplexing investigation.

The only other form of secret poisoning which is likely to occur, and in which the question of survivorship might be raised, is when an individual through malice or revenge poisons a family or the branches thereof, and the surviving relatives, who took no part in the diabolical proceeding, institute rival claims to the property of the deceased.

As, however, in such instances the victims would, for the most part, be surrounded by domestics, and the order of death correctly ascertained, this too may be passed over with the mere mention. The only form of poisoning therefore which deserves to be considered here is the *accidental*.

A very excellent example of this kind of poisoning is given by Zacchias in his 'Consilium' (No. 85).

A man and his family had eaten copiously of poisonous mushrooms, and were taken ill. Before the domestics, who had been sent for assistance, returned, both husband and wife had expired. It appears that two years prior to their death a joint agreement had been made to the effect that the survivor should possess the sum of 2000 crowns. Concerning these 2000 crowns, as a matter of course, a dispute arose, and Zacchias was summoned to give evidence. He decided in favour of the husband, inasmuch as he was proved to have eaten little of the mushrooms, and although 60 years of age, continued hale and hearty; whereas the wife, on the contrary, had eaten largely, and although only 46 years of age, was asthmatic and subject to complaints of the stomach. A poison, therefore, which acts violently on the organs of respiration would naturally soonest destroy one diseased in those parts.

Other examples might be enumerated, but as they would only occupy space without throwing additional light on the subject, they are better omitted.

Poisonings of all kinds, whether accidental or intentional, will be most satisfactorily explained by a close attention to the history and circumstances of the case, in connexion with the post-mortem appear-

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as related by Prof. Beckmann in his article on secret poisoning—the former of whom, as he informs us, was president of a society of young wives whose husbands were poisoned whenever they became offensive; while the latter, among her many enormities, poisoned her two brothers and father. Both those wretches were executed—the one (Spara) in 1659, the other (Margaret d'Aubray) in 1676.

ances. As, however, the same poisons act differently on different individuals, and on some not at all,[1] while many of the post-mortem appearances are identical with those occasioned by disease, it will be at once evident that no definite rules can be laid down for the settlement of questions of survivorship thereby occasioned. To suspect that poison has been administered is one thing, but to demonstrate its existence in the animal tissues is quite another; and to ascertain on whom it may have first exercised its fatal effects is more difficult than either. The immense variety of results produced by poisoning, together with the vast number of poisons themselves, must at all times form a stumbling-block in the diagnosis of such cases; nor is this to be wondered at when it is remembered the deleterious principle may belong to either of the three great kingdoms of Nature—the animal, the vegetable, or the mineral; that it may be irritant,[2] narcotic,[3] narcotico-acrid,[4] or septic[5]—that it may be active[6] or slow,[7] consecutive[8] or accumulative,[9] and that from the peculiarity of idiosyncrasy, its action may, in particular instances, be quite the reverse of what it is in others.[10] The necessity of a law, therefore, in determining survivorship in cases of poisoning seems to be more imperatively demanded than in almost any other mode of death.

Death by Intoxication.—Death by intemperance, though by no means rare in individual cases, seldom supervenes in two or more persons about one and the same time. If, however, it should happen (for nothing is impossible), the medical jurist will have to pay particular attention to the previous history of the persons, their age, sex, and constitutional tendencies; their condition when last seen alive, and, above all, the position of the bodies when found, and the appearance presented by post-mortem examination, particularly the state of the brain. If the body of the one be found partially immersed, or otherwise exposed to cold, or in the vicinity of noxious vapours, or with the face burrowed in the earth, while that of the other is found lying on its side or back in a warm dry spot, and not exposed to a vitiated atmosphere, the chances of survivorship will be greatly in favour of the latter. If, moreover, serious external injuries be found on the one, received evidently in the stupor of drunkenness, while the other is free from such injuries, the chances will be in favour of him exposed to the destructive effects of alcohol only. If on opening the head, traces of cerebral congestion from apoplexy are discovered in the one, while the brain of the other is comparatively normal, the chances of survivorship will be in favour of the latter. But I need not anticipate. These and other casualties are for the consideration of the coroner and his assistants when the case occurs.

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[1] Pouqueville mentions the case of an old man at Constantinople who was in the habit of taking a drachm of corrosive sublimate daily. The inhabitants of the provinces of Lower Austria and Styria are also in the habit of chewing particles of arsenic mixed with their bread, for the purpose, it is said, of making them long-winded. A sexagenarian was in the habit of taking four grains daily, and yet possessed excellent health.

[2] Irritant poisons act by inflaming and sometimes corroding the surfaces to which they are applied; while some act indirectly on the heart and other vital organs.

[3] Narcotic poisons act for the most part by inducing a species of intoxication, drowsiness, stupor, paralysis, or convulsion.

[4] Narcotico-acrid poisons include mushroom poison, strychnia, camphor, belladonna, digitalis, &c., the fatal effects of which are well known.

[5] Septic poisons include animal poisons, such as arise from the stings of insects, the bite of snakes, rabid animals, &c. (Traill's Jur., p. 98.)

[6] An active poison is one which produces death within a few minutes from the time it is taken.

[7] In slow poisoning a single dose is sufficient. The poison produces no sensible effect at first, but gradually undermines the health.

[8] In consecutive poisoning a single dose kills. The poison at first produces violent symptoms, which are followed by apparent cure. Death however sooner or later supervenes from organic lesion.

[9] In accumulative poisoning many doses are required—death being occasioned by the repetition of doses individually harmless.

[10] Schinkens relates a case in which the general laws of astringents and cathartics were always reversed, and Morgagni speaks of an individual who died from eating bread made with the farina of the chestnut.

Death by Starvation.—The laws regulating death by inanition, although somewhat obscure in their operation, are nevertheless pretty well understood from their opposites, the laws of life, with which physiology is tolerably familiar. In order to estimate the probabilities of survivorship in death by inanition, a simple transposition is all that is necessary.

During the first fourteen years of life, or in infancy and childhood, the body, as has been explained, rapidly developes, so that large quantities of nutritious food are constantly demanded. From the fourteenth to the eighteenth year (the period of adolescence), though development steadily proceeds, it is by no means so active as in infancy and childhood; the demands for food consequently are proportionally less frequent. From the eighteenth to the twenty-fifth year (the period of youth) the bodily powers are gradually matured, and still less food suffices. From the twenty-fifth year until the system begins to retrograde or decrease in vital powers, the amount of food required varies according to the amount of work done; but as a rule, less is required for a full-grown man than a growing youth. From the time when symptoms of decay begin to manifest themselves, which constitutes the period of old age, the amount of food requisite for sustenance decreases in an inverse ratio. Making allowance, therefore, for the extremes, i.e., the very aged and very young, death by starvation, as a rule, will supervene inversely as the amount of food required for the support and maintenance of the body in the performance of its healthy functions; thus, cæteris paribus, the child will perish before the youth, the youth before the man.[1] On the same principle the female, who requires a less quantity of food than the male, will outlive him. It is owing to this state of things that those Indian

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[1] The immortal Dante seems to have been aware of this physiological fact, for he describes the ill-fated Count Ugolino as perishing on the eighth day, *after having witnessed his sons sink one by one*, amid the frightful convulsions of exhausted nature. This fact appears to have been also known to the ancient physicians. (Hippocrat., Aphor. xiii. sect. 2.)

Fakirs and others, in whom a low type of vitality has been induced by habit, famine, or disease, have been enabled to survive such incredible periods with so little sustenance. In cases of suspected starvation, the first thing that ought invariably to be done is to note with precision the position of the bodies when discovered. This is of vast importance, for if the one be found in the vicinity of water, and surrounded by a humid atmosphere, while the other is found far from the vivifying beverage and in a parched spot, the chances of survivorship will be infinitely in favour of the former. The accuracy of those remarks will appear from the following facts :

Redi[1] starved a number of capons, to which he gave neither solid nor liquid food. They all died on or before the ninth day. One, however, to which he had given water simply, survived till the twentieth day. Elizabeth Woodcock, who was buried in the snow near Cambridge for the space of eight days, undoubtedly owed her preservation, in the opinion of Paris,[2] to the snow which she occasionally sucked. A part of the crew of the ill-fated Arab ship Futteh Islam, lost in the Indian seas in 1836, were on a raft for the space of eight days and yet survived. In this instance they freely availed themselves of the surrounding medium in keeping their bodies moist, a practice well known to sailors when there is a scarcity of water, and to which they no doubt owed their safety.[3] As a rule, individuals in dry situations, without water, perish about the fourth or fifth day,[4] whereas those who are supplied with water may live till the fifty-eighth day. The resolute Viterbi perished on the twenty-first day,[5] John Brown, the Scottish miner, on the twenty-third day.[6] The subject of a case recorded by Professor McNaughton, on the fifty-fourth day,[7] and Guillaume Granet, the prisoner of Toulouse, on the fifty-eighth day. Other cases are recorded. Valentin mentions a case of a woman who survived seventy-eight days on water and lemon juice. I forbear quoting cases of a still more startling nature as savouring too much of the fabulous. Some authors place considerable emphasis on the condition of the individuals prior to the period of inanition, and this is no doubt worthy of consideration, as the corpulent will live for several days at the expense of their fat alone. This view is favoured by considering the persons suffering as being, after the first few days, on account of their impaired vitality, as much in the condition of hibernating animals, whose respiration is exceedingly slow, and whose blood undulates rather than circulates. I know of no human examples to illustrate this point, but take the liberty of adducing the case of a dog instead.

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[1] Osservag : intorno agli anim. Viventi, &c., Nos. 3 et 4.

[2] Medical Jurisprudence, by J. A. Paris, M.D., &c., and J. S. M. Fonblanque, Barrister. London, 1828. Vol. ii. p. 68.

[3] See also wreck of the Medusa, as given in the 'Quarterly Review' for October, 1817. Of the 150 who on this occasion betook themselves to a raft only 15 survived after 13 days of starvation.

[4] Dr. Gadermann however relates a case of suicide wherein entire abstinence from liquid or solid food was maintained for 23 days. (Henke's Zeitschrift, 1848, 3 H.)

[5] The unfortunate Luc Antoine Viterbi was condemned as an accomplice in the assassination of Frediani—a crime which he denied to the last. Being confined in the prison of Bastia he determined to destroy himself by starvation, a purpose which he effected on the twenty-first day, after having endured the most horrible suffering. He kept a diary of the sensations he experienced, for an account of which see Corsica Gazette and Lond. Med. and Phy. Jour., March 1822.

[6] John Brown, aged 65, lived for 23 days in a coal-mine, during which period his entire sustenance consisted of chalybeate water sucked through a straw. Lond. Med. Gazette, xvii. 389.

[7] Am. Jour. Med. Sci., vi. 543.

A spaniel bitch, fat and rather old, celebrated in former days for her hunting propensities, on one occasion thrust herself into a hole in the face of a rock, from which neither her own efforts nor those of her master were able to extricate her. She remained in her new abode for upwards of a fortnight, at the expiration of which period she returned, to the astonishment and delight of her old master, but so much altered that he scarcely knew her. She had lived on her adipose tissue until she was spare enough to effect her escape. A strictly analogous example occurred a few years ago at Dover Cliffs. A portion of a cliff which overhung a piggery had fallen and covered up an unusually well-fattened pig. The clearing away of the rubbish occupied nearly a fortnight, at the expiration of which time the poor animal was found alive, and tolerably well, although a miserable shadow of its former self.

The post-mortem appearances in cases of starvation are peculiar, and should always be attended to. They are the following. The body is much emaciated, and exhales a fœtid odour; the skin shrivelled, dry, and bereft of cutaneous veins; the eyes red and open; the mouth and fauces dark and parched; the stomach greatly shrunk and ulcerated on its internal surface; the intestines empty and contracted, so as to resemble a cord; the gall bladder gorged with bile, which stains the intestines; the heart, lungs, and large vessels collapsed and destitute of blood; all which signs are accompanied with a tendency to rapid putrefaction.

Of course the same precautions are necessary in diagnosing this form of death which are observed in all others, and it will be necessary before proceeding to the settlement of the question of survivorship to ascertain whether no disease is present which may have caused the appearances which we might otherwise rashly attribute to inanition.[1]

Death by Cold.—This form of death, which in Britain is exceedingly rare unless in very severe seasons, as a concomitant of poverty and intoxication, is perhaps of all extraneous deaths the most gradual and natural. As it acts by destroying the vital energy from without inwards, it follows that those endowed with the greatest amount of animal heat (and therefore better calculated to ward off the insidious influence of the external cold by the irradiation of internal heat) will on all occasions prove the survivors. According to Sir Benjamin Brodie, animal heat is in some way or other dependent upon the integrity of the functions of the nervous system, so that if it could be proved of two or more perishing by cold, that the one at the time of the occurrence possessed a more perfect nervous organization than the others, the probability of survivorship would most assuredly incline to him. In proof of this position it need only be mentioned, and the fact is particularly *à propos* on the present occasion, that persons in the last stage of intoxication, in whom the nervous energy has been diminished by a previous state of morbid excitement, are especially liable to perish from cold,[1] while animals under the influence of narcotic poison are destroyed at a temperature which would scarcely affect others not so enervated. A striking analogy exists therefore between the effects of intoxication, poisoning, and cold itself; so that it appears if after a certain stage a little more of either were added, or of the one to the other, death would follow as a natural consequence. Captain Parry very well describes the similarity in the effects of intoxication and cold. In speaking of the return of some of his crew to the vessel after long exposure, he says, "When I sent for them into my cabin *they looked wild, spoke thick and indistinctly*, and it was impossible to draw from them a rational answer to any of our questions. After being on board for a short time the mental faculties appeared gradually to return with the returning circulation, and it was not till then that a looker-on could easily persuade himself that they had not been drinking too freely."[2]

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[1] The diseases which would produce a similar condition of the body are those inducing mechanical obstruction to the ingestion or chylification of the food.

The temperature at which fatal effects are produced seems therefore to vary according to the strength and circumstances of the individual. Another item which ought not to be overlooked is the rapidity of the cooling process,[3] for in proportion as that is quick or slow, so is life endangered.[4] Examples corroborative of these remarks will be found in the account of the excursion of Sir Joshua Banks and his party to the mountains of Terra del Fuego;[5] in the expeditions of Captains Franklin, Ross, Parry, and other Arctic travellers, and in the melancholy fate of the Cambridge student so often quoted. Death by exposure to cold, which is the most insidious of all deaths, produces its fatal effects by inducing languor, loss of sensation, and an irresistible propensity to sleep, which sleep, in the majority of instances, proves the sleep of death. Mr. Portal was of opinion that cold produced death by inducing apoplexy, an idea which he grounded on the presence of sanguineous congestions in the vessels and cavities of the body, particularly those of the brain, in post-mortem appearances. There is, however, an insufficiency of data to warrant such a conclusion, for although the blood is found collected in the heart, spleen, liver, lungs, and brain, it follows that this may result from that fluid being gradually driven from the surface into the interior—a comparatively slow process, and widely differing from the characteristic suddenness of apoplexy. As moreover the post-mortem appearances in death by cold are by no means conclusive,[1] it appears to me that if we would arrive at a correct diagnosis we should betray more wisdom in taking a wide survey of the circumstances of the case, than by confining ourselves to those alone.

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[1] For information on this point see Police Reports of our own large cities and Le Baume's account of the Campaign in Russia.

[2] Expedition to the North Pole, vol. i. p. 188.

[3] The body is cooled in three ways—by cutaneous exhalation, by conduction from the direct contact of air, and by radiation. The *cutaneous exhalation* is increased by dry air and suppressed by moisture, and so far the heat of the body is affected by this cause. On the other hand the body is cooled by *conduction*, when the air is moist; so that the body is cooled alike by dry cold air and by cold moist air. Of the effect of cold humid winds in lowering the temperature of the body a good example is given by Dr. Currie in the Phil. Trans. of 1792. A rapid renewal of the air, as in a cold brisk wind, lowers the temperature of the body by evaporation and by conduction at the same time; and the effects of a slight breeze in increasing the feeling of cold is familiar to every one. (For. Med., by W. A. Guy, M.B., &c., London, 1844, p. 388.)

[4] Dr. Chassat states that in an animal immersed in a cold bath death may take place at 79° Fahr. (26 cent.) although (17 cent.) before it dies; but, cæteris paribus, the animal dies sooner as the cooling is more rapid.

[5] See Cook's First Voyage.

The difficulty of determining the question of survivorship is particularly evident in cases of death by cold; and as they for the most part occur in desolate places where few are passing, it will be safest in such instances to reason generally from collateral evidence, such as position, time, strength of body, &c.[2] In many cases moreover the amount of circumstantial evidence will be so great as to beget moral certainty. I adduce one case by way of illustration. Upwards of 30 years ago a father and son on returning home from a distance were overtaken by a violent snow-storm. Both succumbed to the inclemency of the weather, and on the bodies being discovered, that of the father was found a furlong or so nearer home than that of the son, while close by the latter was found the staff of the former stuck on end, clearly indicating that the father had survived the son, and that he had set up his stick as a mark to return, and it might be bring succour to his son.

Death by Heat.—The manner in which death is occasioned by excess of heat is as yet very obscure. The little that is known will be conveniently considered under the five following heads—viz., death by conflagration, or where the persons are exposed to the devouring element by the proximity of burning clothes, dwellings, and other heated media; death by scalding, where the victims are subjected to the no less deadly medium of heated water and steam; death by spontaneous combustion, or where the source of the fire is said to exist in the bodies of the individuals suffering; death by sun-stroke and other kinds of natural and artificial heat, such as the Simoom of the Desert, hot laundries, &c.; and lastly, death by lightning.

In death by conflagration the position of the body and the extent and nature of the lesions will do more to settle the question of survivorship than any difference in age, sex, or strength. The only difficulty that might arise in this form of death is whether the burning was produced before, and therefore the cause of death, or after death, and the result of accident or design.[1] This point, as far as the *ante* and the *post* are concerned, will be readily settled by the character of the eschar, for a careful description of which I am indebted to the discriminating pen of Professor Christison. When burns are inflicted during life, a narrow white line appears around the burnt spot. Outside this line is one of a deep red tint, which externally runs by essential degrees into a diffused redness, which diffused redness may be removed by slight pressure, and disappears after death—the deep red line being permanent. After scalds vesications usually make their appearance within a few minutes, although in children it may be hours. Vesication, however, is by no means a concomitant of the application of heated bodies. When burning is applied after death, the appearances will differ according as it took place sooner or later after the decease of the individual. In such instances there will be the absence of the deep red line, not removable by pressure, and if blisters are present they will be filled with air instead of fluid—the cutis being at the same time devoid of moisture. When the burning takes place an hour or so after death, the effect will be to ruffle the cuticle, and dry up the parts to which it is applied. The foregoing remarks, as a whole, apply equally to death by scalding. In death by spontaneous combustion the changes induced in the system by the free use of ardent spirits[2] are such that the body, in a manner but little understood,[3] becomes ignited, and is with difficulty extinguished.[4] As, however, the examples of spontaneous combustion are very rare, and the probability of two or more related perishing by it within a short period of each other, scarcely within the reach of possibility, it may be passed over by simply remarking that it is most common among females, and when it occurs the trunk is usually completely destroyed, the extremities being only destroyed in part. It is further found that the furniture of the room is spared, and that the walls of the chamber are covered with an unctuous humidity. For an epitome of the more illustrative and authentic cases of this form of death the reader may be referred to Beck,[5] who quotes the authorities from whence his narratives have been drawn, as likewise to Smith, Briand, and Sedillot.

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[1] Unless the examiner knew the circumstances in which the body was found, which favoured the supposition of death from cold, he could not possibly assert from these signs that death had resulted from this cause. (Wharton and Stillé's Med. Jur., p. 601.)

[2] Guy says that young, aged, and infirm persons, worn out by disease or fatigue, and those addicted to the use of intoxicating liquors, perish most promptly in the depth of winter. (Principles of Forensic Medicine, by W. A. Guy, M.B. Cantab. London, 1844, p. 387.) See also Wharton and Stillé's Med. Jur., pp. 601, 602.

Death by sun-stroke, which has of late years been very common in America,[6] and is constantly occurring in eastern climates, is characterised by no well-marked post-mortem appearances.[1] It is generally thought to be occasioned by exhaustion from heat, accompanied most probably with some molecular change in the blood, and may be ascribed to the direct influence of the sun's rays or any kind of artificial heat.[2] Professor Trail is of opinion—"that the sun-stroke is a species of apoplexy induced by the direct influence of the sun on the head, and is in some cases similar in its effects to the Khamsin; whereas in others it appears to be produced by congestion of the lungs, resembling what has been called pulmonary apoplexy, of which most distressing dyspnœa is the chief symptom."[3]

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[1] See case related by Foderè, vol. iii. p. 18, where several persons were murdered and the house afterwards set on fire.

[2] See an article 'On the Combustion of the Human Body, produced by the long and immoderate use of spirituous liquors,' by Pierre-Aime Lair in the Emporium of Arts and Sciences, edited by J. R. Coke, M.D., vol. i. p. 161. Also Paper by Thomas D. Mitchell, M.D., in the American Medical Recorder, vol. v. p. 489.

[3] Pierre Aime Lair and others think that the phenomenon is occasioned by an alcoholic impregnation of the body, and that actual contact with fire is then necessary to produce it; while Maffie, Le Cat, Kopp, and Mare attribute it to the agency of the electric fluid.

[4] Water sometimes increases instead of diminishes the burning.

[5] Elements of Med. Jur., by J. R. Beck, pp. 312–316.

[6] In the city of New York alone no less than 260 deaths from coup de soleil were recorded during the summer of 1853, while in the city of Philadelphia during the

No rules can be given for the settlement of the question of survivorship in such cases; but it is just possible that as the young and the old suffer most from cold, they will on this account withstand a greater amount of heat. A case bearing indirectly on this point is quoted by Foderè. An Englishman, and his daughter aged seven, in 1814 crossed the desert of Syria to the Persian Gulf; they rode on camels, and were placed in precisely similar circumstances. The father died, while the child arrived in safety at the journey's end.

Death by Lightning.—Death resulting from lightning is as a rule so instantaneous, that the idea of survivorship is out of the question. Of the numerous forces at work in the external world, there is perhaps none so subtle and disastrous in its effects as electricity. Trees, ships, houses, all the productions of nature and art, bend before its irresistible power; and when man himself is opposed to its dread influence his being is blighted with the rapidity of thought. So incomprehensibly short is the period generally occupied by this mode of death, that even in the presence of competent witnesses the question of survivorship could rarely, if ever, be settled. As, however, there are certain positions which are more exposed than others, it may be of use briefly to advert to them as being likely to contribute to our information on this difficult point. The places which are most exposed to the ravages of lightning are the very spots to which the uninitiated would naturally run for shelter, viz., beneath trees, by stone walls, by buildings, by prominences of all kinds, and, what may appear strange, in vast plains and by rivers. But the reason is evident. It is dangerous to be in the immediate vicinity of whatever attracts. Trees and prominences attract; and, as the body is itself a very good con-

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months of June, July, and August of the same year, the deaths amounted to 57 (Wharton and Stillé's Med. Jur., p. 589).

[1] In some rare cases inflammation of the brain and its membranes is observed; but in the majority of instances, according to Dr. Pepper, the brain exhibits no indication of congestion, and nothing in fact of an unusual appearance. That observer, however, thought the heart pallid, flaccid, and softened, while the other muscles of the body were florid and firm. No difference can be observed between individuals dying of sunstroke and other kinds of heat.

[2] Dr. Smith, of New York, states that 11 patients were admitted into his hospital from the laundry of one of the principal hotels in that city, and that several were brought from a sugar-refinery, where, after working several hours in a close and overheated apartment, they fell suddenly down in a state of insensibility.

[3] Outlines of Medical Jurisprudence, by Thomas Stewart Trail, M.D., F.R.S.E., &c. Edinburgh, 1857, p. 86.

ductor, it follows that if the person be very far removed from eminences of all kinds (as in a plain) he may himself become the source of attraction—i.e., he may form the connecting link between the clouds on the one hand, and the earth on the other; in other words, the electric fluid may pass through him to a negative cloud overhead, or vice versa.[1]

Again, the places most exposed in dwellings are windows, fire-places, partitions, and proximity to mirrors and other polished surfaces. If, therefore, a severe thunderstorm has taken place,[2] and the post-mortem appearances are such as are most readily explained by lightning—the closeness of the bodies to the dangerous neighbourhood may assist in giving a proximate conception of the order of death. There are, moreover, collateral circumstances which might also come into play, such as metallic and other conductors about the person, and the appearance of the body itself; thus if the garments be found rent, and the body much lacerated or contused, while the metallic substances about it (if there be any) be fused and rendered strongly magnetic, the presumption of instantaneous death is pretty conclusive. If, on the other hand, the body be found a considerable distance from a dangerous locality,[3] and the foregoing appearances are presented in a minor degree, then there is (*prima-facie*) a probability that death has not been quite so speedy.[4] It must, however, never be forgotten that these are by no means certain rules to go by, for persons situate in the best possible circumstances to avoid lightning have been struck by it,[5] while those who have been struck by the returning or ascending stroke, as it has been termed by Lord Stanhope, present no trace of the electric fluid whatever. Sir Benjamin Brodie thinks that lightning kills by acting directly on the brain and spinal cord, an opinion which seems to be borne out by individuals who have been struck and recovered,[6] and the post-mortem appearances presented by the bodies of those who did not recover, viz., bluish markings in the region of the spine.

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[1] It is now understood that death may be caused by an electric shock other than the lightning stroke. This takes place when a cloud in near proximity to the earth is negatively electrified while the earth is positive. The human body is here made the conductor by means of which the equilibrium is restored. This is called *the ascending or returning stroke.* (Guy's Principles of Forensic Medicine, p. 384.)

[2] It is not impossible that the stroke of lightning should have been neither preceded nor followed by rain or wind, as is usual in thunderstorms. On Monday the 2nd of July, 1843, about 3 o'clock p.m., five negroes were simultaneously prostrated by a single stroke of lightning on a plantation in Georgia. The sun was shining brilliantly at the time, and a greater portion of the western hemisphere presented the usual serenity of the summer sky. For further accounts see Medical Jurisprudence, by Wharton and Stille, p. 599.

[3] It is thought that a distance of from twenty-five to thirty-five yards from trees, houses, &c., affords places of greatest security in a thunderstorm.

[4] Sir Benjamin Brodie has discovered by his experiments on guinea pigs, that the rapidity of death by electricity varies in proportion to the strength of the shock; and the proximity of the individual to good conductors which would transmit the electric fluid in all its intensity seems to me to favour the idea of more speedy death, and vice versa.

[5] Mr. Taylor in his Elements (p. 288) relates a remarkable example where two persons were struck, although they were situated in a deep hollow surmounted by a lofty tree. These persons however were in a vehicle the metal of which may have afforded a better conductor than surrounding objects of a greater elevation.

[6] In the frightful accident which occurred in July, 1819, to the village church of

The other post-mortem appearances generally enumerated are contusion and laceration where the electric fluid has entered, with sometimes a small aperture denoting its exit—occasional marks of singeing of the clothes, and burning of the body, fluidity of the blood (John Hunter), the absence of cadaverous rigidity in the muscles, and the rapid tendency to putrefaction. These three last signs, however, have been very properly disputed. Sir C. Scudamore has found that the blood in the veins of animals killed by electricity is always coagulated. Sir Benjamin Brodie observed that animals killed by the electric spark become rigid after death, and Dr. Francis and Beccaria each mention a case where the individual perishing by a stroke of lightning became excessively rigid.

The question of putrefaction is also obscure, and requires at least further confirmation. Granting, however, that those signs obtained, they might all be referred to other kinds of death. In death by lightning, therefore, as in many other kinds of death already adverted to, the post-mortem appearances are by no means conclusive, a circumstance which renders the question of survivorship exceedingly difficult.

Recapitulation.

The topics more particularly dwelt upon in the foregoing pages, of which a hasty résumé may serve to impress the leading features, are these :—

First. The term presumption has been referred to its origin, and the various meanings attached to it in the phrase "presumption of survivorship" pointed out.

Secondly. The laws framed for the regulation of questions of survivorship have been traced from the earliest times, their insufficiency in many instances having been clearly established.

Thirdly. The scarcity of positive law, especially in Britain, has been shown to be the source of much dissatisfaction to surviving relatives.

Fourthly. An attempt has been made to frame, on physiological grounds, such a code of laws as will fairly meet the majority of cases.

Fifthly. The difficulty attending such an attempt has also been explained, and abstracts given of the more celebrated cases in which the interference of positive law would have been beneficial.

Sixthly and lastly. The chances of survivorship in death by parturition, by wounds, by suffocation, by starvation, by cold, by sun-stroke, by lightning, and by burning have been considered at length; and the precautions to be taken in arriving at a correct diagnosis specified.

Châteauneuf-les-Moustiers, situated on one of the summits of the Lower Alps, of the eighty-two more or less injured many suffered from paralysis of the lower extremities.

Art. II.

On a Supplementary System of Nutrient Arteries for the Lungs. By William Turner, M.B. Lond., F.R.S.E., Senior Demonstrator of Anatomy, University of Edinburgh.

It is a well-known fact in anatomy, that each lung has, in addition to the pulmonary artery conveying venous blood, one or two small nutrient arteries passing to it. These vessels, called bronchial arteries, are derived, as a rule, either from the thoracic aorta, or in part from that vessel and in part from its upper intercostal branches. In this communication I wish to show that these usually described bronchial arteries are not the only nutrient vessels of the lung, but that it receives, in addition, a number of slender supplementary nutrient arteries from other quarters.

If the systemic arterial arrangements in the cavity of a healthy thorax be carefully injected with size and vermilion, or other colouring matter, and the pleural cavities then opened by removing portions of the ribs, and muscles attached to them, the general distribution of the arteries in the thoracic walls may be examined without difficulty. The vessels to which I wish more particularly to direct attention are the internal mammary arteries and the trunks of the thoracic intercostals, as they lie in relation to the bodies of the dorsal vertebræ. From each internal mammary artery, besides other branches to which I need not now refer, arise sundry small arteries known as pericardiac and mediastinal branches, and a long branch accompanying the phrenic nerve and passing along with it to the diaphragm. These vessels are all situated beneath the mediastinal pleura, and lie therefore between it and the pericardium. They do not, as is implied in the descriptions usually given in anatomical works, end simply in the fibrous bag of the pericardium, in the fat of the mediastinum, the thymus gland and the diaphragm, but they give off, in addition, branches which anastomose and form an arterial plexus, which from its position may conveniently be termed the sub-pleural mediastinal plexus. The general arrangement of this plexus can be examined without using either knife or forceps, by drawing the lung outwards, and tracing the slender arteries filled with injection beneath the transparent mediastinal pleura. The arteries are elongated, thread-like vessels, of almost uniform calibre throughout, and the mesh-work which they form by their intercommunication is open and irregular.

If now the lung be raised from its position and thrown forwards, the thoracic and superior intercostal arteries may be seen in relation to the bodies of the dorsal vertebræ, and from the greater number of them fine arteries arise similar in their characters to those just described. These vessels lie beneath the posterior mediastinal pleura, and supply the fat, areolar tissue, and glands of the posterior mediastinal space, and the hinder part of the pericardium. Those on the right side lie in close relation to the œsophagus, and anastomose with its proper arteries. Those on the left side run forwards in close relation to the outer coat of the descending thoracic aorta. These fine arteries also anastomose with each other, and form the posterior portion of the sub-pleural mediastinal plexus. Above and below the root of the lung they send branches forward which inosculate with the division of the plexus lying in front of that structure. In giving a description therefore of the anastomoses of the internal mammary and intercostal arteries, it is not sufficient to refer merely to those occurring in the diaphragm and costal walls, but the inosculations between the vessels forming the anterior and posterior divisions of the sub-pleural mediastinal plexus must be included.

This plexus is interesting, not only because it serves to afford an additional channel of communication between the arteries of supply for the thoracic wall, but because from it the supplementary system of nutrient arteries for the lungs arises.

In a healthy well-injected thorax, these vessels may be seen without any difficulty, passing to the lung in the following manner:—Some proceed from the anterior division of the sub-pleural mediastinal plexus in front of the root of the lung, to its inner aspect; others from the posterior division of the plexus pass behind the root of the lung, and others reach it by running between the two folds of the pleural membrane, known to descriptive writers as the ligamentum latum pulmonis. Having reached the lung by one or other of these three routes, the fine thread-like arteries are distributed as follows:—Some pass deeply into the root of the lung, and run along with the bronchial tube into its substance; others again, and these apparently the greater number, are more superficially placed, and may be readily traced beneath the pulmonic pleura for a considerable distance; not unfrequently they accompany those branches of the pulmonic vein which lie near the surface of the lung. From the mode of origin and general distribution of these arteries, there can, I think, be no doubt that they are fine accessory nutrient vessels, and supplement, therefore, the bronchial arteries in their distribution. I am unable to state, with certainty, the exact mode of termination of these vessels in the lung; but from their close analogy to the bronchial arteries in their distribution, it may, I think, safely be assumed that those which pass any distance, either in the substance or on the surface of the lung, end in the pulmonary system of vessels, either arteries, capillaries, or veins.

The sub-pleural mediastinal arterial plexus from which these vessels arise presents several interesting relations, of which it may not be amiss to say a few words. From the circumstance that, on the one hand, it anastomoses with the arteries which supply the parietes of the thorax, and, on the other, that it is in communication with the vessels of the lung, it serves to place the vessels of the latter in direct communication with the arteries of the wall—a relation the importance of which will be readily recognised. In a paper published in the 'Medico-Chirurgical Review' for July, 1863, I recorded the results of some observations on the arrangement of the arteries in the abdominal cavity, and I pointed out that there existed in the fat and areolar tissue behind the peritoneum a well-marked arterial plexus, to which I applied the term of sub-peritoneal arterial plexus. Through it, not only are the arteries of one viscus in vascular communication with those of another, but the arteries of the abdominal wall are in communication with the visceral arteries, so that one set of vessels may be injected through the other. The sub-pleural mediastinal plexus now described, so far at least as it affords a medium of communication between the visceral and parietal arteries, has in the thoracic cavity an arrangement closely comparable to that of the subperitoneal plexus in the cavity of the abdomen.

I believe that in certain cases of malformation of the heart this sub-pleural plexus would, if carefully examined, be found to have assumed a size and relative importance greater than that which it possesses under ordinary conditions. I refer to those cases in which the pulmonary artery is obliterated, and the ductus arteriosus closed, so that the supply of blood to the lungs is derived from other sources, and would suggest that those who may have opportunities of examining cases of this kind should inject this system of vessels.

In conclusion I may state, as a general result of my injections in these and other localities, that though the area or domain appropriated to each artery is, as a rule, clearly defined, yet that where adjacent areas are in contact, the arteries of one almost invariably inosculate with the arteries of another, and, under some conditions, actually encroach upon the domain of another.

Art. III.

Geographical Summary of the Yellow Fever Epidemics of Peru.

By Archibald Smith, M.D.

In the years 1817–18, troops were concentrating in Lima, lat. 12° 2′ S.; lon. 76° 58′ W. from Spain, with a view to suppress the Patriot insurrections in Chili and Peru; and in unison with those political disturbances it was that yellow fever first appeared in Peru, in January, 1818.[1] It came upon the stage under the mask of a catarrhal fever and diarrhœa, but in the succeeding months of February and March it developed its true character, and continued in the epidemic form till April, when it disappeared, without having propagated itself beyond Ica, lat. 14° 0′ S.; lon. 75° 58′ W. Towards the end of July, 1851, a catarrhal fever, or grippe, suddenly appeared in Lima. It attacked the whole population, and proved fatal to many aged and infirm persons in the form of pneumonia. This grippe in the months of August and September visited all the populations of the country, on the Andes as well as on the coast. In 1852, and contemporaneously with the importation of successive bands of German immigrants, a new epidemic disorder took the field in Lima, and soon

[1] In 1730, "Vomito Prieto," or Black Vomit, appeared among the Spanish coast-guard shipping in the Pacific; and Don Antonio de Ulloa, in his 'Voyage to South America,' tells us that in the year 1740 yellow fever first became known at Guayaquil.

spread over all the length and breadth of the maritime valleys of the coast.[1] It carried off its victims in some of the more crowded Indian villages, as Catacaya and Colan in the neighbourhood of the city of Piura, lat. 5° 12′ S., lon. 80° 45′ W.; but in Lima, though it attacked nearly every one, few lost their lives from its effects. This disorder as observed by me in Lima was marked by headache, with a feeling of tension over the forehead, suffused eyes, aching limbs, great restlessness of body, and in the more severe cases, insomnolency. The skin when touched imparted a peculiar sensation of heat to the physician's fingers; and the pulse, bland and depressible, was sometimes as low as eighty or ninety, quite out of proportion to the cutaneous heat evolved. At the end of from three to eight days this fever disappeared with some critical phenomenon, such as epistaxis, or a roseolous eruption on the surface of the body, or with a general perspiration of a most fetid odour, leaving behind weakness and lassitude; inappetency, with a very disagreeable taste in the mouth, craving for acidulated drinks, and a strong repugnance to animal food for several days. Convalescence was very slow, and out of proportion to the shortness and general mildness of the febrile attack. This epidemic lasted, to the exclusion of mostly all other complaints, from early in January to July.[2] From the end of July, 1852, to the month of February, 1853, Lima rested from the so-called "peste" or epidemic that I have just described. But in February, 1853, we had a fresh epidemic visitation, which exhibited very much the symptoms of the preceding one, but in a more aggravated shape. The hemorrhagic tendency of the malady was more strongly declared, the roseolous eruption more rarely seen, and a large proportion of those attacked the previous year were again attacked by the reigning disorder, in which the second stage was frequently marked by a great depression of vital power. The first decided transition from this manifestation of the epidemic to the more aggravated form of yellow fever, with black vomit, occasioned great excitement in the capital and the active interference of the Prefect, by whose order, on the 18th of May, the public hospitals were cleared of all suspicious cases—as yet very few in number—and sent outside the gates of the capital to an hostelry, or *tambo*, where they were placed under the charge of Dr. Herrera, physician to the hospital of incurables. The three earliest cases (of which the two last were formal ones of prefectorial investigation) are the following:—1. Miss Annie Gibson, who on the sixth day of her illness died of black vomit on the 16th of April.[1] She was a patient of my own, and assisted in consultation. 2. Don Miguel Criado, who arrived from Talcahuana, in Chili, on the 7th of May, was seized with fever in Lima, on the 14th of May, and twelve hours after the invasion was attacked with black vomit, from which, however, he recovered under the care of Dr. Herrera. 3. Lieutenant Nicolas Pizarro, who, without leaving the capital, was seized with symptoms of what he believed to be a common cold. I saw him on the 19th of May, by order of the Prefect General Don Pedro Cisneros, not many hours before his death occurred from yellow fever and fatal black vomit; he only lasted four days from the invasion of this fever. These were the pioneers of declared yellow fever in 1853; they had no communication with one another; and up to the month of July, when the Lima winter is established, and this epidemic, like that of the preceding year, had ceased, only a few more isolated cases were observed, as so many exceptions to the general character of the prevailing disorder. Yellow fever in its mature and fully developed type (of which a few cases appeared in Callao in the last week of December, 1853), early in January, 1854, sprung up in Lima with extraordinary generality, and continued in full force to the end of March; but by the middle of April it had nearly exhausted itself. This year's fever, like that which preceded it in 1853, had two well-marked periods, one of excitement, followed by another of far more than corresponding depression. In the great majority of cases the disease terminated happily on the third, fourth, or fifth day, in a general sweat, followed by a slow, but safe, convalescence; yet no one could predict in the first stage how the second was to end, but in too many cases that termination was fatal after a delusive lull in which the patient appeared to be very much at ease, just before black vomit closed the drama.[2]

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[1] The first of these immigrants arrived at Callao on the 9th of Dec. 1851. At the time it was a popular cry that these were the importers of the epidemic that almost immediately on their arrival commenced its visitation in the capital. But without being the importers, they, and numerous other Europeans and strangers that about this period crowded into Lima, might well be the originators, on the well-known principle pointed out by Humboldt, that the inhabitants of a colder and more healthy country, when transferred into the torrid zone, are easily affected by a hot air and vitiated atmosphere, which scarcely at all affect the acclimated organs of the indigenous inhabitants.—'Essai Politique,' vol. iv. B. v. ch. xii. pp. 503-4.

[2] From the 4th to the 10th of May, 1852, I attended Admiral Moresby, when sick of this year's epidemic, in the family of Mr. Frederick Pfeiffer, in Lima, whose house for the three previous months was crowded with poor sick Germans lodged under his charitable roof, one of whom, an elderly woman, after a lull of apparent convalescence, suddenly died, on Feb. 16th, with dark melanotic alvine evacuations. The admiral ordered his flag-ship 100 miles out to sea, by which the crew were saved from this pestilence.

In 1855, Lima enjoyed repose from yellow fever, but instead of it had epidemic intermittents, which appeared in wards of the town scarcely ever before infested by ague. In 1856, however, yellow fever revived in the capital, and produced many deaths, among strangers especially, in form of black vomit. After the battle of the Palma, which took place on the 5th of January, 1855, in the immediate outskirts of Lima, the battalion "Cuzco" was ordered to Trujillo, lat. 8° 0′ S., lon. 79° 3′ W., and here yellow fever soon broke out among these troops.

At Islay, lat. 16° 32′ S., lon. 72° 43′ W., yellow fever appeared in a limited number of cases, and among these was Dr. Segara, who died of black vomit, as early as April and May, 1854, and by April, 1855, it became so terrible at this sea-port, that the town was nearly deserted. At Arica, lat. 18° 28′ S., lon. 70° 24′ W., many cases of yellow fever occurred in March, April, and May, 1854; but it was not until April, 1855, that this pestilence, in epidemic form, entered the city of Tacna, lat. 18° 0′ S., lon. 70° 12′ W., nine leagues from the sea, and 1816 feet above its level. At Arica the battalion Tacna, from Lima, disembarked on the 8th April, 1855, and marched into the town of Tacna on the 12th of the same month; and in the suburbs called "Rancheria," where these troops took up their quarters, yellow fever, in less than a week after their arrival, broke out with violence, especially in the hemorrhagic form, with frequent examples of black vomit.[1]

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[1] In my paper on the 'Rise and Progress of Yellow Fever in Peru,' published in the Edin. Med. and Surg. Journ., April, 1855, I stated that this case occurred in *March*, but this was a mistake in date, which I beg leave to correct.—A.S.

[2] During the reign of yellow fever in Lima, in 1854, several instances were known of persons who left Lima for Chili infected with the fever; but from these cases yellow fever was *never*, that I heard of, propagated in Chili. Steamers touching at Rio Janeiro in 1851-52, and destined to the shores of the Pacific, Lima, &c., lost many lives, at sea, of yellow fever.

In this hemorrhagic form, from the 4th to the 5th day, the pulse became depressible, and the strength failed. From the 3rd to the 4th day epistaxis frequently appeared, and sometimes resisted the power of all astringents; the gums became spongy, and oozed dark blood; the tongue, at first red, with flesh-coloured edges, acquired a dark and sanguineous coat of varnish; the respiration was slow, with occasional deep sighs. When there was pain at the epigastrium, it was not so acute as in the congestive form. Petechial mulberry-coloured spots on the skin were of frequent appearance, and in strongly hemorrhagic cases were seen on the conjunctivæ and urethra. Black vomit and dark stools also presented themselves with frequency; the urine was generally abundant, and as the disease advanced it had the colour of port wine or strong coffee. The skin became yellow, and the dejections tinged the same colour. In the majority affected by this hemorrhagic form the intellect remained unimpaired, but in other cases the mind was bewildered and stupid. This second period lasted from four to six days, or more, and after that came death or convalescence.[2]

On the 15th of May, 1855, the battalion Cuzco left Lima, and embarked at Callao, with destination to Islay, and having landed there, proceeded inland to Arequipa (lat. 16° 20′ S., lon. 71° 32′ W.), and, by the road of Cuebillas and Lampa (lat. 15° 20′ S., lon. 70° 10′ W.), towards Cuzco. But they were soon abandoned by most or all of their officers, and dispersed into groups, begging their way at every hut and hamlet, and leaving fever and sickness everywhere in their track. At length, having crossed the great western Cordillera, by the pass of Santa Rosa, and descended upon the town of Sicuani, situated on the east side of the West Cordillera, 3532 metres above sea-level (lat. 14° 25′ S., lon. 71° 20′ W.), the fever became epidemic, and the Prefect of Cuzco sent medical men to visit the epidemized troops, and report to the authorities in the city of Cuzco, only twenty-five leagues from Sicuani. This ancient city stands at the elevation above the sea of 3463 metres, lat. 13° 30′ S., lon. 72° 20′ W. The epidemic yellow fever reached this city from Sicuani, in October, and from November, 1855, to May, 1856, out of from thirty to forty thousand inhabitants, it lost one-third by this horrid pestilence. The duration of the fatal cases during this fearful flood of mortality cannot be precisely estimated, though we are assured it did not generally exceed from three to six days; nor could it be more, where the deaths were so numerous, and when those who dropped in the morning in the street, or on the hill-side, had none to help them, for the dread of contagion, and were dead before sundown; or if they died in the night, they were eaten up by dogs before morning. From Sicuani and Cuczo the disease spread all over the southern departments of Cuzco and Puno. In the sugar-growing valley of Abancay, lat. 13° 37′ S., lon. 72° 30′ W., at the elevation of 7850 feet above the sea, with a summer temperature of 24, and a winter temperature of 17 degrees Réaumur, the unfailing symptoms of the first stage were cephalalgia, and deep pain in the eyes and orbits, followed by the second (hemorrhagic) period of great prostration, with maculæ, vomiting and evacuations of dark blood, yellow skin, &c.

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[1] What is called black vomit is not always black, but of different shades of colour, from black to dark grey, green or brown, &c.

[2] Lima Med. Gaz. April, 1859. Paper by Dr. Don M. Macedo.

On the 5th of April, 1855, Col. M. H. Zeballos entered the city of Ayacucho (or Guamanga) beyond the West Cordillera, situated in lat. 12° 57′ S., lon. 73° 58′ W., at the head of the battalion Aymaraes from Lima. On the 8th of April he resumed his march towards Cuzco with many sick in his train, and upon arriving in Chincheros (lat. 13° 20′ S., lon. 73° 40′ W.), the first case of yellow fever among these troops broke out towards the end of April, and became so general by the month of July, that it commanded the attention of the local authorities and governor of the district, who took sanitary measures to prevent the spread of this pestilence by contagion. But by the month of August it had extended as far south as the province of Abancay, and had infested all the villages northward, as far as Yscuchaca on the river Jauja, and the town of Huancayo, lat. 12° 15′ S., lon. 75° 12′ W. At Huancayo the epidemic attained its height in September and October; and I was informed by Dr. Mascote, of Lima, who visited Huancayo in the middle of July, that on his arrival there was no fever in that district, but soon after there was a rumour abroad of cases here and there; and he attended in consultation with Dr. Dianderas, a friend of his own, of white race, who had been six days ill of the fever when this consultation took place. The patient presented at the time a slight oozing of blood from the gums, with vomiting of a very dark colour, approaching in appearance to *black vomit.* Both Dr. Dianderas and Dr. Mascote were familiar with the Lima epidemic of the preceding year, and considering the Huancayo case as a modified form of the same disease, they treated it accordingly with turpentine, and on the third day from the commencement of the dark vomit this patient recovered.

As early as September, 1853, a soldier deserter from Lima introduced this epidemic yellow fever from the capital to the parish of Chacas, in the province of Huari (or Upper Conchucos), where it became epidemic in Yurma, lat. 9° S., lon. 76° 40′ W. From here it, step by step, and from town, village, hamlet and grazing farms, overran all North Peru;

northward to Jaen, lat. 5° 35′ S., lon. 78° 50′ W., and S. E. as far as Carguamayo on the east side of the lake Chinchaycocha, lat. 11° 4′ S., lon. 75° 20′ W. The fever entered the city and valley of Huanuco, lat. 9° 59′ S., lon. 75° 56′ W., early in February, 1855, and, with the slow progress of a contagious malady, it ascended from this rich and tropical sugar-growing district, village after village, till it entered Cerro Pasco, lat. 10° 35′ S., lon. 75° 50′ W., in July, 1855. In Cajamarca, lat. 7° 7′ S., lon. 78° 31′ W., at the elevation above the sea of 9000 feet, it proved most fatal, as it also did in Chota, lat. 6° 20′ S., lon. 79° 2′ W.

In 1857, yellow fever prevailed much in Lambayeque on the coast, lat. 6° 42′ S., lon. 79° 58′ W. From this point it is said to have spread inland to Cajamarca, and there revived the fever of 1855, which had reigned for six months, and then became nearly dormant till 1857, and continued its ravages until 1858, when it took its final leave of the Sierra.

Betwixt the epidemics on the coast and mountains of Peru from April and May, 1853, when yellow skin and black vomit first became *occasional* symptoms of the fever, to 1857–58, when all yellow-fever epidemics ceased, only to be followed by diphtheria (which spared the negro, and attacked with decided preference the better-accommodated white race), in the capital of Peru, several notable climatic differences were observed. Among these may be mentioned splenic enlargements, as seen by Dr. Daza in the mild climate of Siguas, Conchucos, lat. 8° 50′ S., lon. 79° 55′ W.; and hepatic complications, as observed by Dr. M. Macedo at the elevation of Huaras, lat. 9° 10′ S.; lon. 77° 25′ W. In Ayacucho, at a milder and less elevated station, hepatic congestion was observed to intervene in course of the fever, which usually ended favourably by perspiration, or fatally by hemorrhage, on or before the eighth day; but early remedial measures were adopted by Dr. Don Pedro Espinosa, and with success, to modify the first stage of the disease, so as to prevent these new complications in the second.[1] In the mountains, as on the coast, the yellow colour was by no means a general symptom; it did not appear in any considerable degree in the milder, and happily the more usual cases, but only in the more severe and fatal. On the Andes, however, the yellow hue was sometimes so strongly pronounced as to pass through the bedding of the sick or dead, in cases so rapidly fatal that the patients died after two hours' illness. At the elevated station of Huancavilica, 3798 metres above sea-level, lat. 12° 50′ S., lon. 75° 5′ W., the fever was twice as protracted as in the milder intermediatory climate of Ayacucho, at probably little more or less than 9000 feet above the sea; the fever at Huancavilica was more like the endemic typhus called *tabardillo.* The heat was excessive; the face of a violaceous colour, and thirst intense. Pain at the epigastrium and vomiting rarely were experienced. From the fifth to the eighth day, livid petechiæ might be seen (though not always) on the trunk and extremities; but these were not usually accompanied or followed by hemorrhage, as in Conchucos, and also in Tacna, on the coast.[1] At Islay, on the coast, vomiting and evacuations of dark blood were common and most fatal forms of the epidemic in April and May, 1855; but the true black vomit, so common in Lima in 1854, seems to have been superseded generally in the valleys and table-lands of the Andes by vomiting of dark, decomposed-looking blood; though in Cuzco cases have been noticed of what appears to have been black vomit, probably like that observed by Dr. Mascote at Huancayo. At Huancavilica the epidemic poison seems to have been so far neutralized by cold as to have prevented the peculiar action of that agent in destroying the natural cohesion of the molecules of the blood, and also the healthy tonicity of the vascular tissues; but at lower elevations, where the mean temperature did not fall below 50° Fahr., we find the hemorrhagic feature, as a general rule, more strongly pronounced than on the coast—a fact which may be partly explained by the ordinary effects of a highly-rarefied atmosphere. The pressure of the atmosphere on the sea-board favouring that slow filtration from the stomach and intestines which produces black vomit and dark stools; while the diminished atmospheric pressure on the Andes, above a certain level, would naturally favour the undue expansion of the blood (deteriorated in its vitality), and the consequent rupture of containing vessels, whose coats had lost their natural powers of resistance under the epidemic influence. At higher regions, near the snow line, the physicians of Cuzco observed that the epidemic action had been so weakened that it could no longer develope itself as yellow fever, but only in the form of ordinary typhus.[2]

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[1] I was informed by Dr. Don Pedro Espinosa, that at the Lazaretto of Quicapata in the immediate vicinity of Ayacucho, no exudation of blood from the gums was observed; while in Huanuco this was one of the most prevalent symptoms of this epidemic. At Ayacucho, generally from the 5th to the 6th day, there was profuse epistaxis, accompanied with maculæ, or large blackish spots on all the trunk of the body. At this stage of the disease the headache, which had been constant and intense from the beginning of the attack, ceased. About the same time the skin assumed the yellow hue of the broom blossom, as did likewise the conjunctivæ, which at the commencement were injected with blood, and in the progress of the fever took on the yellow tint in common with the skin. The mind was dull of perception, and the prostration great. Convalescence was very slow, and the fever eminently contagious.

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[1] See Lima Med. Gazette, April, 1862, for a description of the Huancavilica epidemic of 1855-6, by Dr. Villar. The violaceous colour of the face observed at Huancavilica was also sometimes seen in Lima, in 1853, in the congestive form, of which the ex-Prefect, Col. Porras, died; and the pain at the epigastrium and vomiting, so rare at Huancavilica, were frequent in Conchucos, where gastric irritability was excessive in the congestive-icteric form.

[2] For such as may desire further information on the history, symptomatology, pathology, and treatment of the Peruvian epidemics above merely indicated, I beg leave to refer to my paper on 'The Rise and Progress of Yellow Fever in Peru,' in the Edin. Med. and Surg. Journ., April, 1855; and to my 'Memoir on the Spotted Hæmorrhagic Yellow Fever of the Peruvian Andes,' read by the late Dr. J. O. M'William, before the Epidemiological Society of London on 2nd Dec., 1861, and afterwards published in Part iii. of the Transactions of that Society. See also an article entitled "Notices from Par Soldan on the Yellow Fever of the Peruvian Andes," in the London Medical Times and Gazette, Sept. 10, 1864, and at p. 294.—A. S.

Art. IV.

On the Cause of the Respiratory Murmur. By A. T. H. Waters, M.D., Physician to the Liverpool Northern Hospital.

Various causes have been, from time to time, assigned for the production of the respiratory murmur; and although, in a practical point of view, its exact seat and proximate cause may appear unimportant, provided we are familiar with the sound itself, and can rightly interpret the modifications of it which result from disease, yet it must be confessed that clear views of the physical phenomena of all healthy organic actions are very desirable; and just as our knowledge of the simple manner in which the sounds of the heart are produced has facilitated our diagnosis of cardiac diseases, so more precise information than that we already possess, with regard to other points of a similar nature, cannot fail to be followed by beneficial results.

To the physical condition of the lung it is obvious that we must look for an explanation of the cause of the respiratory murmur; and there is one anatomical point which has either been unknown to those who have given their attention to this subject, or has been overlooked by them, but which nevertheless appears to me to offer a satisfactory solution of the phenomenon under consideration.

Without attempting to examine critically the opinions of others, I must content myself with observing that I believe the air-sacs of the lungs to be the seat of the murmur; and I shall now proceed to point out the arrangement which exists at the mouth of each air-sac, to which arrangement I am of opinion that the sound is due.

I have pointed out elsewhere[1] the manner in which each bronchial tube terminates in a series of air-sacs; and the passage which has the most important bearing on the question of the cause of the respiratory murmur is the following:

"The air-sacs consist of somewhat elongated cavities, which communicate with a bronchial ramification by a circular opening, which is usually smaller than the cavity to which it leads, and has sometimes the appearance of a circular hole in a diaphragm, or as if it had been punched out of a membrane which had closed the entrance to the sac."

This arrangement, which I have endeavoured to depict in the figures, is best seen in the lungs of children and of adults. In old age it has frequently disappeared, more or less. It may be often well seen in a piece of lung, the blood-vessels of which have been injected with coloured size, and which, after being dried, has been subsequently soaked in spirit. By careful dissection under a microscope the membrane guarding the mouth of the sac, and narrowing the entrance to the cavity, is easily demonstrated. The membrane forms a part of the aërating walls of the air-sac, and has branches of the pulmonary artery ramifying in it.

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[1] The Anatomy of the Human Lung.

It is obvious that a condition of this kind must have an influence on the passage of the air into the air-sac; that, to a certain extent, it must produce an impediment to the current of air, and thus would give rise to a sound.

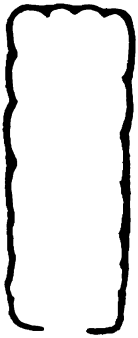

Fig. 2.

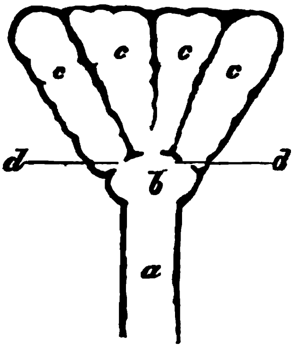

Fig. 1.

Fig. 1. Represents a terminal bronchial tube with a group of air-sacs; *a*, terminal bronchial tube; *b*, dilated extremity of the terminal bronchial tube forming the *point de réunion* of the air-sacs; *c*, *c*, air-sacs; *d*, *d*, mouths of air-sacs.

Fig. 2. Represents a single air-sac.

As the air is moved along the bronchial tubes it meets with no obstruction to its passage; but at the commencement of the air-sacs an opening exists which is smaller than the cavities between which it is placed. As the air-sacs expand with each inspiration, air must pass through the constricted opening. I believe that, in the passage of the air through this opening, the main element of the respiratory murmur consists.

The following facts appear to me to afford argumentsin favour of the view I have advanced: the respiratory murmur is loud and well marked in infancy and childhood; it becomes modified in adult age, and in old age it is frequently very feeble. In the infant the membrane placed at the mouth of the air-sac is well marked and uninjured; the opening in it has a clearly defined and harp margin; and, moreover, it is smaller—not only absolutely, but I believe also relatively—than in after life. In the adult, the air-sacs have undergone enlargement, and the membrane at their entrance is more or less perfect according as the lung is in a more or less healthy state; whilst in old age, the membrane has often, to a great extent, disappeared, apparently as the result of the wasting and absorption which so frequently occur in the lungs of those advanced in life.

Further, the changes which take place in the character of the respiratory murmur in emphysema of the lungs afford an additional argument in support of this view. In this disease, in consequence of distension, rupture, and absorption, the air-sacs become much altered in character, and the membrane guarding the entrance to them entirely disappears as the disease progresses. The obstacle to the passage of air is therefore removed; and hence the reason of the extremely feeble respiratory murmur which characterizes the affection.

Art. V.

Observations on the Measurement of the Head and Weight of the Brain in 696 Cases of Insanity. By Robert Boyd, M.D., Physician to the Somerset County Lunatic Asylum.

Tables of the weights of the human body and internal organs at various ages, in the sane and insane of both sexes, by myself, have appeared in the 'Philosophical Transactions,' 1861. The tables now given relate to the insane only, include a greater number of cases, and are of considerable magnitude. The forms of the disorder are given under eight heads, at ages in decennial periods. The average measurements[1] and weights of the body and cerebro-spinal organs are also given, and the numbers from which those averages are taken. The first table shows the average measurements of the head at decennial periods of life, under the different specified forms of insanity in 403 males and 293 females examined in the Somerset County Lunatic Asylum. The specified forms of insanity are mania, dementia, melancholia, monomania, general paralysis, epilepsy, epilepsy combined with idiocy, and idiocy. Of these mania is the most common: one-third of the females and more than one-fourth of the males are classed under this head; it includes twelve cases of recurrent and seven of puerperal mania. Dementia, which includes cases of fatuity in both sexes, altogether amounts to 16 per cent. in males, and 20 per cent. in females. Melancholia is much more frequent in females than in males; the proportion is 9 per cent. in males, and 18 in females. Monomania embraces only a small number: 3·9 per cent. in males and 3·7 per cent. in females. General paralysis is very frequent in males, but not nearly so much so in females; it is combined with various forms of mental disorder, but these are not distinguished in the tables; 25·6 per cent. males come under this head, and 7 per cent. females. Epilepsy is also combined with various forms of disorder, but these, as in the case of general paralysis, are omitted; the numbers are 14·6 per cent. males and 14 per cent. females. The two remaining forms include a small portion of these cases. Epilepsy with idiocy, 3·2 per cent. males, and 2·2 per cent. females; idiocy, 2·2 per cent. of males and females.

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[1] The measurements of the skull are taken with an ordinary inch tape; circumference from centre above nose and *superciliary* ridge over the great tuberosity of the occipital bone behind round to the same point in front; antero-posterior from the same point above the nose to the great tuberosity of the occipital bone; transverse from one external auditory *meatus* over the head to the other. The weights are given in pounds and ounces, and decimal parts of an ounce, avoirdupois.

The following is a summary of cases in each form of the disorder:

	Males.	Per cent.	Females.	Per cent.
Mania	104	25·4	97	33·3
Dementia	65	16	58	20
Melancholia	36	9	52	18
Monomania	16	4	11	3·3
General paralysis	102	25·6	20	7
Epilepsy	58	14·6	41	14
Epilepsy and idiocy	13	3·2	7	2·2
Idiocy	9	2·2	7	2·2
	403	100	293	100

The periods of life are also under eight different heads in the tables. In the first (under 20 years), the affections of children, idiocy and epilepsy, 16 in males and 3 in females; and 2 of melancholia in females include the whole mortality at that period. In the second, from 20 to 30 years, the per centage is 12 for males and 12·5 for females, the largest proportion being still of epileptics and idiots. In the third period, from 30 to 40 years, mania prevails, especially among females, and general paralysis in males; in this and in the next period, from 40 to 50, are included all the forms of insanity. In the fifth period, the number of cases of epilepsy and idiocy are less. From 60 to 70 the relative numbers were greater of females—12 per cent. males and 17·1 per cent. females. In the seventh period, from 70 to 80, no case of general paralysis occurred. The proportions of each sex were nearly equal in the last period, upwards of 80; the cases were principally dementia and fatuity.

The following is a summary of cases in each period of life:

Age.	Per centage of Males.	Per centage of Females.
Under 20 years	4	2
20 to 30 „	12	12·5
30 to 40 „	22	21·5
40 to 50 „	25	20
50 to 60 „	15	16·4
60 to 70 „	12	17·1
70 to 80 „	8	8·5
Upwards of 80	2	2
	100	100

The three measurements of the head are shown in the first table in inches and decennial parts of an inch. Taking the whole of the cases at all ages and in all forms of the disorder, the average circumference is in males 21·9, and in females 21·1 inches; the antero-posterior measurement is 12·7 inches in males and 12·5 inches in females; the transverse measurement is 12·6 in males and 12·3 inches in females. The measurements all greater in males than females. In idiocy the measurements are below the average in both sexes, also in epilepsy combined with idiocy in males—the measurements are slightly below the average in general paralysis. In melancholia and epilepsy the measurements are greatest; after 50 there is decrease. The circumference of the head denuded of the scalp is one inch less, and each of the other measurements half an inch less.

The second table shows the average weight of the several parts of the brain in ounces avoirdupois and decimal parts of an ounce, at decennial periods, in the different forms of insanity. The weight of the several parts of the brain is more in males than females; and as a general rule, the left cerebral hemisphere is larger than the right. The average weight of the right cerebral hemisphere in the males is 19·89, and the left 19·96; in the females the average weight of the right cerebral hemisphere 18·53, and the left 18·61. The greatest inequalities in the hemispheres are observed in epileptics and idiots.

The following Table shows the maximum, minimum, and average weight of each cerebral hemisphere, in ounce avoirdupois, in the eight different forms of insanity in males and females, at all ages:

—	Maximum weight.				Minimum weight.				Average weight.			
	Right hemisphere.		Left hemisphere.		Right hemisphere.		Left hemisphere.		Right hemisphere.		Left hemisphere.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Mania	25¼	23¾	26	23¾	16¾	15½	14	16	20·85	18·58	20·82	18·71
Dementia	24¾	23½	25	23¾	14	13	14	13	20·32	17·84	20·45	17·92
Melancholia . . .	24	24	24¼	24¼	14¼	11¾	14¼	11¾	20·18	19·01	20·23	19·25
Monomania	23¼	21½	23¼	21¾	18¼	16¼	18¼	15¼	20·71	18·84	20·86	18·83
General paralysis .	24¾	24½	25	24¼	14¼	14¼	13½	14¼	19·14	18·42	19·32	18·47
Epilepsy.	25¼	20¼	25¼	21½	13¾	15	8	15¾	20·44	18·22	20·6	18·2
Epilepsy and idiocy .	25¼	22¾	26	22¼	14¼	17	15½	16¾	18·05	20·02	18·57	20·24
Idiocy	22½	18	22½	18¼	14¼	13½	13	13¾	17·6	16·53	17·5	16·6

The average weight of the remaining portions of the brain, the cerebellum, pons and medulla oblongata, encephalon, and also of the spinal cord, are shown in the following Table:

—	Cerebellum.		Pons and medulla oblongata.		Encephalon.		Spinal cord.	
	M.	F.	M.		M.	F.	M.	F.
Mania	5·42	4·82	1·13	·98	48·21	43·18	1·12	1·01
Dementia	5·14	4·72	1·05	·95	47	41·55	1·05	1·08
Melancholia	5·33	4·87	1·05	·98	47·31	44·11	1·1	·95
Monomania	5·08	4·73	1·01	·96	47·62	43·4	1·1	·81
General paralysis . .	5·32	4·85	1·08	·95	44·88	42·47	1·04	1·05
Epilepsy	5·09	4·72	1·03	1·08	47·11	42·2	1·15	1·1
Epilepsy and idiocy .	5·05	4·74	1·17	·98	42·7	45·4	1·05	1·02
Idiocy	4·7	4·76	·88	·93	42·28	38·83	·85	1·1

The average weight of the encephalon was greatest in mania in males, and in epilepsy combined with idiocy in females, but these cases are few—only seven in number. The average weight of the encephalon is least in idiocy, in both males and females. The average measurement of the head is also least in idiocy in both sexes, and greatest in dementia and epilepsy in males, and in epilepsy and idiocy, and general paralysis in females.

The average weight of the encephalon in the whole number was 3¼ ounces more in males than in females; the average circumference of the head, as already stated, being eight-tenths, the antero-posterior two-tenths, and the transverse measurement three-tenths of an inch more in males than in females.

The relative proportion of admissions into the Somersetshire Asylum has been 55·5 per cent. males, and 48·5 per cent. females; the relative mortality, 58 males to 42 females.

PART FOURTH.

Chronicle of Medical Science

(CHIEFLY FOREIGN AND CONTEMPORARY).

HALF-YEARLY REPORT ON PHYSIOLOGY.

By Henry Power, F.R.C.S., M.B. Lond.
Lecturer on Physiology at the Westminster Hospital.

I. General Physiology.

Kühne, Dr. W.: *Researches upon the Nature of Protoplasma and Contractility.* (Leipzig, 1864.)

Dr. Kühne's work is divided into the following sections:—1. The nature of the albuminous substances composing muscular tissue. 2. The phenomena of movement presented by the amœba. 3. The analogous phenomena presented by the Actinophrys Eichhornii. 4. Those of the Myxomycetæ. 5. Those which may be witnessed in the cells of the hairs of the Tradescantia virginica. 6. A description of the protoplasm of the cells of connective tissue. 7. A description of the protoplasm of the cells in the cornea. 8. The connexion established between protoplasm and nerve substance. And lastly, the action of the nerves upon protoplasm, with the function of the nerves of the cornea. Of these various topics, several of which are of considerable interest, and upon which much attention appears to have been bestowed by the author, we have only here space to give a brief abstract of his statements respecting the first and the last two.

He remarks, that if a portion of the muscle of a frog, freed as far as possible from blood, be rapidly dried, and treated with a one per cent. solution of common salt, a fluid may be obtained containing a portion of the proper muscular substance, which, after a short time, will undergo coagulation; showing that it had escaped solidification (rigor mortis) before desiccation had taken place, and thus establishing a distinction between it and the fibrin of blood or lymph, since these fluids, even when spread out in the thinnest layers, invariably coagulate before drying up, however quickly that process may be conducted. No coagulable substance can be extracted on treating the film left by either liquid with solution of common salt, but a rapidly frozen portion of frog's muscle, when thawed, sufficiently soon regains a portion of its irritability, and only after the lapse of some hours passes into the state of rigor mortis, whence it may be concluded that the fluids contained in the fibres still retain their characteristic properties. By exposing the minutely divided frozen muscles of several (eight to twelve) frogs to a warm temperature and filtration, a small quantity of a somewhat troubled and feebly alkaline fluid may be obtained, which, if allowed to drop into a weak solution of potash, instantly coagulates, but re-dissolves on falling through the liquid; it also solidifies spontaneously after two or three hours if slightly warmed, but if kept at 32° F., long retains its fluidity. Solidification usually commences at the sides of the vessel, and gradually extends in the form of flakes over the surface and through the mass of the fluid, until the vessel can be inverted without danger of its falling out. A little albuminous fluid, like the serosity of the blood, is exuded during coagulation, like it also undergoing a further coagulation on exposure to heat, and containing three distinct forms of albumen—namely: 1, albuminate of potash, combined with phosphate of soda; 2, a form of albumen which, independently of the reaction of the fluid, coagulates at a temperature of 112° F.; and 3, a form of albumen coagulating at a temperature of 167° F. A few hours after the spontaneous coagulation of the juice of meat has taken place, the mass possesses an acid reaction. If the coagulum is frozen and again thawed, no change in its characters is apparent.

There can be no doubt, M. Kühne thinks, that the muscle-coagulum thus obtained is identical with the substance which is separated during the post-mortem rigidity of muscle. He does not, however, consider it proved, that the coagulum is composed of syntonin, or that living muscle contains syntonin, or that the spontaneous coagulation of the fluid of living muscle is attributable to the separation of syntonin from its solution. When perfectly frozen the muscle clot is neutral, white when moist, and yellowish when dry, giving a yellow colour with nitric acid, and the usual orange tint when treated with Millon's reagent; it contains sulphur combined in two different ways, and is insoluble in alcohol, in ether, and in water, but is readily soluble in very dilute acids and alkalies, from which it may again be extracted unchanged. These last-mentioned solutions behave themselves exactly like those of syntonin. Kühne applies the term myosin to the albuminous substance he has obtained by the above method, and observes that it differs from syntonin essentially in the circumstance that it is readily soluble in solutions of common salt.

In the section on the protoplasm of the cells of connective tissue, he observes that he found the tissue connecting the muscles of the limbs of frogs to be the best adapted for observation, and the following remarks refer to this alone. It was examined without the aid of reagents, except in so far that a little filtered frog's serum or lymph was applied. In such specimens, he observes, the looped connective tissue fibrils may be seen lying in a delicate, vitreous-like matrix, intermingled with meshes of elastic tissue, the fibres of which everywhere preserve the same thickness, and also with irregularly distributed cellular elements. The description of the cells differs somewhat from that generally received. In any small fragment of connective tissue, of a line or two in diameter, he believes that three forms of cellular elements may be distinguished, which, though not quite sharply differentiated from one another, are yet sufficiently so to enable well-marked examples of each to be easily recognised and defined. Of these, the first are structures consisting of an extremely fine, granular mass, rarely spherical, but always exhibiting outrunning prolongations, often of considerable length. These structures sometimes lie scattered independently of one another in the matrix of the connective tissue; at others, are united by twos and threes by means of the caudate prolongations, and are most abundant in healthy frogs. They possess no nuclei, but only a thicker and more opaque central mass, and their boundary line is always ill-defined. 2. The second form resembles the first, except that they are more strongly defined, present fewer prolongations, and contain a beautifully clear, vesicular, and elliptical nucleus, with double walls, and a nucleolus. 3. The third form is characterized by their more coarsely granular appearance, their troubled aspect by transmitted, and brilliant white aspect by reflected light. They are, for the most part, strung together in cords by the union of their prolongations, and are seldom met with grouped in masses. They often contain nuclei. The two first-mentioned forms of cells of the connective tissue possess a contractile protoplasm, the movements of which are especially obvious in those having many delicate prolongations. The movements are very slow, and only to be recognised by the closest attention, continued for the space of from ten to fifteen minutes. The processes may be observed to unite together into one, or are thrown out or withdrawn, gradually but completely altering the form of the cell. In the third form of cell above described, Kühne has never been able to discern any movement of the protoplasm. After the lapse of some hours, when the movements in the former kinds of cells had ceased, it was found impossible to re-excite them by stimuli directly applied. He seems to doubt the existence of any cell wall in these forms.

If we follow the changes which are induced in connective tissue by means of reagents, we shall soon perceive how the older views of its constitution originated. In the first place, the opinion that it is difficult or impossible to see the cells in perfectly fresh connective tissue, was consequent upon treating the specimen with water, for this obscures the first two cell forms, though the third form is still apparent. Moreover, the previously very distinctly granular protoplasm contracts itself in water and forms a very firm network, which radiates from the nuclei, and connects itself at many points with the intercellular substance. The nuclei at the same time swell up, their contour becomes well defined, and in their interior a cavity presenting a reddish tint appears. Subsequently the nucleus becomes lenticular, and may even collapse to a very small and rounded corpuscle. Coincidently with these changes in the nucleus and protoplasm, a concentric marking takes place around and outside the nucleus, which might be considered as the indication of a cell wall, though, from its want of continuity and for other reasons, Kühne holds this to be doubtful, considering it rather as a space or cavity surrounding the nucleus.

He remarks, that the addition of acetic acid has usually been employed for the exhibition of the cells of connective tissue, and that this reagent certainly brings out the nuclei remarkably well, though materially altering their form, whilst it also renders the fibrillar intermediate tissue gelatinous and transparent; but it undoubtedly changes the characters of the latter, the protoplasm of the cells shrinking up into a fine network, that adheres to the nuclei, and branches out from them into short processes, or, if the cells have previously been caudate, into long ones. The effect of acetic acid is to render the nuclei darker than when water alone is applied, which is, perhaps, attributable, in part, to the crumplings and foldings of the nuclei, and partly to a granular precipitate occasioned by the presence of mucin. With very dilute acetic acid the connective-tissue cells become surrounded by a similar concentric marking to that above described, and here also Kühne considers it to be a space formed by and in the surrounding fibrous network rather than the expression of a cell wall, for he has observed its edges bristling with minute points.

He recommends soaking the specimen in a solution of one-tenth per cent. of sulphuric acid, and subsequently in distilled water (104° F.), as good means for dissolving or rendering transparent the gelatinous elements of the tissue, and for bringing out the corpuscles and elastic filaments. And here, again, there is little or no evidence of the presence of a cell wall, whilst it becomes apparent that the corpuscles *are not connected with the elastic fibres in any way whatsoever*. The contractility which belongs to the protoplasm of the connective-tissue corpuscles is well preserved in serum, but not in distilled water; but even in the former it is easy to put a sudden stop to the movements by a few shocks of induced electricity or by a heat of 104°, though no physical changes can be observed after the application of these agents with the microscope.

Cellular tissue which has been allowed to remain for some hours in serum, undergoes certain changes, amongst the most marked of which are that the cells are with difficulty to be discovered, although the nuclei are darker and more clearly defined. The protoplasm of these cells has lost its granular character, and forms dull flocculi. Dilute acetic acid does not cause the appearance of the peculiar nets which occur when fresh cells are acted on, but the acid seems to produce a closer rolling up or gathering of the substance into glomeruli. Hence Kühne is disposed to consider that the cell protoplasm undergoes a rigor mortis similar to that of muscle protoplasm, and occasioned by the solidification of a substance which is fluid during life. It differs, however, from that of muscle in that there is no corresponding troubled or dim appearance due to the separation of a granular material; it also occurs earlier than in the case of muscles.

Kühne describes a method of preparing sections of the cornea (essentially consisting in keeping them moist whilst under examination) by which they show stellate cells. The protoplasm contained in these cells is capable of performing "spontaneous" movements of an exceedingly torpid character, but gradually changing the form of the cell from the stellate to the fusiform shape, or the reverse. The excitation of an interrupted current of electricity, or of sudden changes of temperature, more rapidly effects the alteration in form. He observes that all the nerves entering the cornea are invested by a very distinct sheath, which becomes pale and indistinct near the centre of the cornea, whilst the axis cylinder becomes very pale, varicose, and connects itself with one of the caudate prolongations of the stellate cells. Finally, he believes that he has been able to discover movements in the protoplasma and cells, as a consequence of the direct electrical excitation of the nerves.

II. Blood.—Circulation.

1. Dr. W. Preyer: *On Amœboid Blood Corpuscles.* (Virchow's Archiv, 1864, p. 417.)
2. Dr. P. L. Panum: *On the Proportion of the Blood generally, and of its several Constituents, in very Young Dogs, as compared with Adult Animals.* (Virchow's Archiv, Bd. xxix., 1864, p. 481.)
3. J. N. Czermak: *Observations on the Pulse.* (Mittheilungen aus dem Privat Laboratorium, Heft 1, 1864, p. 27.)

1. Preyer remarks that the entrance of certain coloured particles, as of indigo and carmine, into the interior of blood corpuscles, had been observed by Häckel, Recklinghausen, and others, in the invertebrata. The corpuscles in which this process was noticed resembled amœba cells, and it appeared to follow that in these animals at least the white blood corpuscles possess no cell wall. Similar observations have been now made by Preyer in animals much higher in the scale—viz., in some of the amphibia. It may be witnessed by adding a few particles of indigo, mingled with a little lymph freshly taken from the animal, and examined without a covering glass in a moist chamber (Recklinghausen's arrangement.) For the first ten minutes no change is observable; but subsequently, with careful and continuous attention, it is easy to confirm the truth of Häckel's statements. Similar phenomena may be seen by employing Schulze's method of injecting coloured liquids into the lymph sacs. In this way Preyer has observed particles of indigo, carmine, cinnabar, and globules of milk to be taken up by the amœboid cells of batrachia, and is conse-

quently of opinion that the colourless corpuscles of the blood and of the lymph of batrachians are essentially the same as the blood-cells of the invertebrata; that is to say, they are particles of protoplasm, destitute of an investing membrane, but possessing for the most part one or more clearly distinguishable nuclei. Preyer applies these facts to the explanation of the hitherto inexplicable pathological phenomena of large cells enclosing in some instances pigment molecules, and in others groups of blood corpuscles, as in the spleen. His mode of proceeding for the purpose of obtaining good observations is to excite inflammation and suppuration in one of the cutaneous lymph sacs of the frog, and then to prick a small blood vessel, so that the blood may escape into the sac. After a few days, the contractile amœboid cells, containing pigment granules and blood corpuscles, can with some care and trouble be discovered. The larger cells proceed from the coalescence of smaller ones with their contents, and the movements of the cells may be observed to effect sometimes a division, and sometimes a coalescence of the newly-absorbed material. He holds that the amœboid cells proceed directly from metamorphoses of the red corpuscles, which he has watched, and of which he gives numerous drawings.

2. Dr. Panum finds, on comparing the blood of a newly-born dog with that of the mother, that the former contains a much larger proportion of solids than the latter; and that this difference is essentially attributable to the very large proportion of red corpuscles contained in the blood of the young animal, as is shown by chemical analysis, by the specific gravity of the defibrinated blood, and by the evidence obtained from Welcker's "colour test." His results are consequently in full accordance with those of Denis and Poggiale. Panum found in 1000 parts of the defibrinated blood of the mother 138·3 solid residue, in the blood of these recently born animals 192·6, 222·3, and 228 parts of solid residue. The specific gravity of the blood of the mother was 1039·6; of the young, 1053·6 and 1060·4. On examining the blood of somewhat older animals (seven weeks), Panum found that the quantity of solids, and especially of red blood corpuscles, had undergone a diminution, whilst the proportion of water and of fibrin had increased; but that at a still later period, when growth was completed, the proportion of solids had again risen, without, however, their having attained the high per centage characteristic of the recently born animal. Other points, which he believes to be incidentally established by his investigations, are, that the composition of the fœtal blood as regards the proportion of red corpuscles is essentially independent of the composition of the maternal blood, appearing to be a function of fœtal cell-formation. Further, it seems that the proportion of water contained in the blood at different ages by no means exhibits a corresponding ratio to that present in the different tissues, which, as Von Bezold has shown, constantly diminishes with the advance of life. Again, he believes he has proved that the quantity of blood in the newly-born animal is somewhat smaller than in older creatures, but the difference is small, and sometimes scarcely observable. Lastly, from some experiments on the effects of inanition in dogs, he finds that, *cæteris paribus*, well-fed, fat animals contain a smaller proportion of blood, in proportion to their weight, than sparingly-fed, lean young animals.

3. Czermak, after a consideration of the various kinds of sphygmographs at present in use, arrived at the conclusion that a perfect instrument should be destitute of weight, without friction, and capable of being applied to the artery under the most various circumstances. To fulfil these conditions he has employed the agency of light, and has constructed an instrument which he has termed a photo-sphygmograph, in which the movements of a ray of light reflected from a small mirror, placed upon the artery, are received and photographed upon a screen of prepared collodion. With this instrument he has made some observations on the rapidity of the propagation of the pulse. He found—1. That as the mean of a series of twenty experiments, the pulse in the

radial artery at the wrist was 0·018 sec. earlier than in the dorsal artery of the foot. 2. That as the mean of a series of twenty-one experiments, the shock of the heart occurred 0·159 of a sec. earlier than the pulsation at the wrist, and 0·193 sec. earlier than that of the dorsal artery of the foot. 3. In another series of experiments he observed that the shock of the heart was 0·087 sec. earlier than the pulse in the carotid, and that the pulse of the carotid was 0·094 sec. earlier than that of the dorsalis pedis. From these and other observations he believes he can prove—1. That the rapidity with which the pulse-wave is propagated from the heart towards the arteries is not precisely equal in all parts of the arterial system. 2. That the rapidity of the pulse-wave in general diminishes in its passage from the centre towards the periphery; that is, towards the capillary vessels. 3. That the rapidity of the propagation of the pulse is less in children than in adults. He found the retardation in children not to correspond in any way with the absolute shortness of their vessels, but that its absolute amount was in many instances even greater than in adults. 4. The phases of the elevation of the thoracic wall from the shock of the heart do not occur synchronously with the phases of the movement of the pulse at the root of the aorta, but clearly precede the latter; in other words, the maximum of elevation of the thoracic wall is somewhat earlier than the maximum of expansion of the aorta at its commencement.

III. ABSORPTION.

1. F. DE RECKLINGHAUSEN: *On the Absorption of Fat.* (Gazette Medicale, 1864, p. 593.)
2. Dr. A. WILLEMIN: *Experimental Researches on Cutaneous Absorption.* (Archives Gén. de Méd., 1864, and Robins' Journal de l'Anatomie, vol. i. 1864, pp. 573.)
3. M. DANCEL: *On the Influence of the Ingestion of Large Quantities of Fluids in Obesity.* (Comptes Rendus, t. lviii. 1864, pp. 1149.)
4. W. S. SAVORY: *On the Absorption of Dead Bone.* (Med. Chir. Trans., vol. xlvii. 1864, pp. 103.)

1. M. Recklinghausen injected into the abdominal cavity of rabbits that had been previously kept fasting for several days a variety of different substances; amongst these were milk, blood, oil, and many colouring matters suspended in oil, as cinnabar and cobalt. He has always found, on subsequent examination, that the lymphatic vessels of the diaphragm contained the actual particles of the fluids injected. In making investigations as to the mode in which the entry of these substances into the vessels was accomplished, he observed that the particles were contained in the epithelial cells covering the diaphragm, and other parts. This, however, was not constant; the lymphatics sometimes containing the foreign particles, though none were perceived in the epithelial cells. The general conclusion at which he arrives is, that the superficial plexus of lymphatic vessels covering the tendinous centre of the diaphragm communicates with the cavity of the peritoneum by means of openings situated *between* the epithelial cells, and having a diameter of about double that of a blood corpuscle.

2. M. Willemin believes that he has proved the absorption of water by the skin, in simple or mineral baths, by exact weighings of the body before and after immersion. These weighings have shown that on coming out of a warm bath in which the body has been kept for from thirty-five to forty minutes, no change is perceptible in the majority of instances; in about one-third of the cases a slight diminution is observable, which, however, is very small when compared with the amount which is lost on exposure to air. It is rare to find

any positive augmentation. Now, chemical analysis shows clearly that in a warm bath a continuous process of exhalation is taking place from the skin; hence, unless compensated for by absorption, there should in all cases be a marked diminution in the weight of the body. The absorption of water does not appear to be influenced either by the composition, or by the density of the liquid employed; but it varies in a remarkable manner with the physiological conditions. The absorption of iodide of potassium, dissolved in the water of the bath, may be shown by an examination of the urine voided after immersion. The quantity dissolved should be at least 1500 grains, since it is not discoverable in the urine when a small quantity, as 500 or 600 grains, have been introduced. After an acid bath the urine generally becomes alkaline, but after an alkaline bath it always preserves its natural acidity. The specific gravity of this secretion is diminished after immersion, whether in baths of pure or mineral water.

3. M. Dancel, in a series of observations undertaken with the object of diminishing extreme obesity, remarked that they who consumed substances containing but a small proportion of fat did not become thinner if they still continued to drink abundantly; whence he was led to imagine that water and watery fluids favoured the deposition of fat in the body. He is surprised that attention has not been directed to this point, in the numerous experiments that have been made on dieting animals, where considerable quantities of fluid have sometimes been allowed; and he proceeds to adduce several remarkable instances that have fallen under his own notice. In one instance a lean cavalry horse was made the subject of the following experiment:—The daily ration of the animal was diminished by the deduction of 3 lbs. of oats, whilst it was allowed the usual quantity of straw and hay, and an abundant supply of water, with which about a pound of bran was admixed. In twenty-seven days the horse had gained nearly 38 lbs. in weight. In the same regiment was a very fat mare, that sweated much on moderate exertion, and that, like fat men, had abnormally liquid evacuations, and drank much (nearly 60 quarts per diem). On reducing the quantity of fluid to 30 quarts the animal soon became reduced in size, free from perspiration, active and energetic.

4. In this paper Mr. Savory gives the results of a series of experiments, in which pegs and plates of human bone were inserted into holes drilled in the bones of living animals, in some instances tightly, in other instances loosely. On examining the pegs some weeks subsequently, it was found that where they had been tightly rammed in, absorption had manifestly taken place; but when they had simply laid in loose contact with the surrounding tissues, whether bone or other texture, no change in weight occurred. Hence he draws the conclusion, that the contact of dead bone when in contact with living bone is determined by the *pressure* to which it is subjected.

IV. MUSCLE.

1. Dr. J. RANKE: *Researches on the Chemical Changes accompanying Muscular Exhaustion.* (Reichert und Dubois-Reymond's Archiv, Heft iii. 1864, pp. 320.)
2. MM. OLLIVIER and BERGERON: *On the Action of Sulpho-cyanide of Potassium on Muscular Fibre and on Blood.* (Comptes Rend. de la Société de Boulogne, t. v. sér. iii. 1863–1864, pp. 22.)

1. Ranke refers to his former researches, published in 1863, on the influence of the products of disintegration upon the energy and excitability of muscular tissue. The present essay is a continuation and extension of those investigations. He finds—1. That kreatine, notwithstanding the difference of

its chemical composition, possesses an exhausting power upon muscular fibre precisely similar to that of lactic acid. Its effect when injected into the cardiac vessels (previously cleared of blood by injection of a weak saline solution), of an animal poisoned by woorara, is almost instantaneous; the exhaustion of the muscular fibres being exhibited not only in the diminished power of raising a weight on irritation, but also, as occurs in exhaustion produced as usual by effort, in an increase of the excitability of the fibres. On removing the kreatine by injection of a weak solution of common salt, the energy and normal irritability of the muscle are restored. The well-known exhausting effect of the juice of flesh upon muscular fibre, thus appears to be due to the presence of the lactic acid and kreatine which are contained in it. 2. Kreatine, notwithstanding its more powerful basic properties, possesses no exhausting influence on the heart, yet it slowly destroys or abolishes the contractile energy of the heart and transversely striped muscular tissue. 3. Ranke believes that after tetanic contraction of muscle there is an increase in the quantity of the substance analogous to grape-sugar discovered by Meissen in muscle. Experiments, made by injecting solutions of this sugar, show that it is an indifferent substance so far as regards the contractility of muscle. 4. Neither urea nor uric acid, nor hippuric acid, exert any perceptible influence upon the force of contraction or excitability of striped muscular fibre. When, however, injections of urea are made, it is found, that whilst the cardiac and respiratory movements continue to be unaffected, all spontaneous and reflex movements are stopped. Ranke believes that these curious effects are due to the urea operating not upon the muscles, nor upon the nerves distributed to them, but upon the brain; and he made a series of sections with the view of determining the exact part acted on. He finds it to be the portion of brain lying between the middle of the cerebrum and the middle of the corpora quadrigemina; that is, the part corresponding to Setschenow's inhibitory centre (see 'Report on Physiology,' Jan., 1864, p. 233.) This part is excited by injection of urea, and the result is speedy paralysis of the entire peripheric reflex apparatus. Very similar effects follow the injection of hippuric acid, but this substance seems to have a determinate and peculiar exhausting power over the heart, not extending to other muscles. 5. Carbonic acid is a powerful depressor of the vital properties, both of muscular tissue and of peripheric nerves; it also rapidly paralyses the activity of the brain and spinal cord. 6. Glycocholate of soda is a paralysing agent on striped muscular fibre. 7. The salts of the alkalies have, if any, only a transitory effect when injected.

2. MM. Ollivier and Bergeron show that the loss of muscular irritability resulting from the action of sulpho-cyanide of potassium is accompanied by remarkable changes in the tissue, the fibres losing their transparency and transverse striation, and presenting a granular appearance. In the same way, the blood corpuscles of the pyrenæmata swell up and ultimately burst, the nucleus is set free, and this after a short time undergoes the same change; the corpuscles of the apyrenæmata become crenulated, and finally break up into fragments. As regards the effects of the salt on the process of coagulation of human blood, it was found that when two portions of blood were received, one into an empty vessel, the other into a vessel containing a little solution of sulpho-cyanide, the former had firmly coagulated in a quarter of an hour, whilst the latter formed a thick soupy mass, of a vivid red colour. Three hours after, on passing a gentle but continuous stream of oxygen through both specimens, the clot of the normal blood became diffluent in three to four minutes, while the poisoned fluid underwent no change.

V. RESPIRATION.

DR. NESTOR GRÉHANT: *Physical Researches on the Respiration of Man.* (Robins' Journal de l'Anatomie for Sept. 1864, vol. i. p. 523.)

M. Gréhant considers the subject of the respiration under the following heads:—1. The absolute capacity of the lungs. 2. The process by which the renewal of the air in these organs is effected. 3. The volume of air taken in during an ordinary respiration. And 4. The changes effected in the expired air. The experiments made to elucidate the first point were performed on thirteen healthy young persons, whose ages varied from seventeen to thirty-five years. They consisted in breathing into a known and considerable volume of hydrogen in a closed vessel, and were based on the fact (shown by Regnault and Reisat) that hydrogen is only very slightly absorbed by the blood when respired, whilst from its high diffusive power it rapidly mingles with the air contained in the lungs. Gréhant consequently presumed that, after a few respirations, perfect admixture had taken place between the air contained in the lungs and the hydrogen in the vessel, and therefore proceeded to deduce the quantity of air originally present in the lungs from the results obtained, by subjecting the mixed gases contained in the receptacle to chemical analysis. He found that the absolute volume of air contained in the lungs after a (forced ?) expiration, was from 129·7 c. i. to 196·5 c. i. As regards the second point, he believes, from the results of experiments conducted on similar principles, that about one-third of the pure air that is taken in with each inspiration is again thrown out with each expiration, the remaining two-thirds penetrating by diffusion into the ultimate bronchi and vesicles, and renewing by their admixture the air rendered impure by contact with the pulmonary mucous membrane. In reference to the distribution of freshly-inspired air, he finds that after two movements, one of inspiration the other of expiration, each equal to about 30 c. i., the pure air is distributed throughout the lungs in a perfectly uniform manner, so that to all the small bronchi and to all the pulmonary vesicles the same quantity of oxygen gains admission, each volume of air in every part receiving a little more than one-tenth of fresh or pure air. M. Gréhant then determines what he terms the co-efficient of ventilation for the lungs. This he finds by dividing the volume of pure air introduced into the lungs with each inspiration by the number which measures their capacity, and he finds that the co-efficient of ventilation is proportional to the amount of inspired air; but if the amount of inspired air remain constant, it augments and diminishes with the increase or diminution of the absolute capacity of the lungs. In regard to the duration of contact of the inspired air with the pulmonary mucous membrane, he finds that when a certain quantity, (say 31 c. i. of air), has been inspired, it is not wholly eliminated again from the lungs until after the tenth subsequent expiration. In reference to the volume of air ordinarily inspired, he finds that with a temperature of 69·°8 F. it is 31·06 c. i., at 60·°8 F. it is 31·42 c. i. In each instance, the number of respirations was seventeen per minute.

In reference to the temperature of the air expired, M. Gréhant found that when the temperature of the atmosphere was 71·°6 F. the air inspired by the nose and expired by the mouth possessed at all periods of the expiration nearly the same temperature, 95·°5 F., though if the thermometer were placed under the tongue, it indicated a temperature of 98° F. The air issuing from the lungs is saturated with watery vapour at a temperature of 95° F. The absolute amount of water exhaled in twenty-four hours by the lungs is between nineteen and twenty ounces avoirdupois, though some deduction must be made on account of the aqueous vapour present in the air inspired.

VI. INTESTINE.—BILE.

1. AUERBACH, Dr. L.: *On the Nervous Supply of the Intestine.* (Virchow's Archiv, 1864, p. 457.)
2. DÖNITZ, Dr. W.: *On the Mucous Membrane of the Intestinal Canal.* (Reichert and Dubois-Reymond's Archiv, 1864, p. 367.)
3. THIRY, L.: *On a New Method of Isolating the Small Intestine.* (Sitzungsberichte d. k. Akad. d. W. in Wien, 1864, No. 6; and Henle and Meissner's Bericht, 1863, p. 255.)
4. HOPPE-SEYLER, F.: *On the Destiny of the Bile in the Intestinal Canal.* (Archiv f. Path. Anat. u. Phys. xxviii. p. 241.)
5. RÖHRIG, A.: *On the Influence of the Bile on the Activity of the Heart.* (Archiv d. Heilkunde, 1863, p. 385.)

1. L. Auerbach states that in 1862 he discovered and described a new layer of nervous tissue abounding with ganglionic enlargements in the coats of the intestine, and that his discovery was subsequently substantiated by the observations of Kölliker and Frey. The present paper contains the result of his more recent observations:

(1.) The chief plexiform layer of nervous tissue in the intestinal wall is always situated between the circular and longitudinal layers of muscular fibres, and the fibres of which it is composed have a general circular arrangement. They are found throughout the whole length of the intestine, and contain numerous ganglia. In the higher orders of the animal kingdom the development of the layer is very considerably greater than in the lower, and the larger the animal the more coarse are the fibres and the wider are the meshes of the plexus they form.

(2.) The nervous plexus of the intestine is intimately connected on the one hand with the great centres of the nervous system through the mesenteric nerves; and on the other hand, with the pneumogastric nerves through its communication with the gastric nervous plexus. It is also connected with the nervous layer lying beneath the mucous membrane of the intestine (Meissner's layer). The connexion with the mesenteric nerves is accomplished through a plexus which lies immediately beneath the serous layer of the intestine.

(3.) The histological constituents of the plexus mesentericus are fine primitive nerve fibres, ganglion cells, and connective tissue. The fibres are grouped in bundles of from two to four, or four to eight, surrounded by a delicate nucleated sheath.

The nerve cells are often unipolar, two such cells having their rounded extremities apposed, and the issuing fibres running in diametrically opposite directions. At other times they are di-, or multi-polar; sometimes the cells appear to be destitute of prolongations.

A minute description follows of the arrangement of the fibres in the plexus, the chief points of which may be gathered from the following physiological conclusion at which he has arrived. He says, it is first to be remarked that the conduction of irritation, or of a stimulus in the circular direction, is abundantly provided for by the presence of numerous transversely-running and very long nerve fibres. Secondly, that in regard to the propagation of a stimulus in the longitudinal direction, if it is to pass beyond a few zones the ganglion cells must co-operate in its conduction, since the longitudinal fibres are frequently interrupted and intercommunicate by means of such cells. Further, he observes, that the numerous plexiform arrangements everywhere present, bringing the nerve fibres into intimate relation with one another, together with the frequency of unipolar cells, and the extreme delicacy of the investing sheaths of the bundles, lead naturally to the idea that a leaping over or transference of a given stimulus from one fibre to another, analogous to the paradoxical contraction of muscle, may here take place, and may play an important part in the propagation of longitudinal contractions of the muscular fibres of the intestine. If the ganglionic cells do not participate in these acts, it is still probable that they exert an influence on the rhythmical movements of the intestines.

2. Dr. W. Dönitz, in speaking of the supposed open extremities of the epithelium of the intestinal canal, observes that many circumstances are opposed to it. When the fat globules, of notable size, observed by Brücke, are found in the epithelial cells, it is to be regarded either as a post-mortem occurrence, or as the result of mechanical violence. Under all ordinary and normal conditions, the fat contained in the cells is so finely divided as to give them a nebulous appearance, and can never be discerned as discrete drops. Again, the projection of the cell contents observed by Brücke, and believed by him to be evidence of the absence of a basal membrane to the columnar epithelium, is very doubtful, as the appearance may be due either to the bursting of a cell situated in front of, or behind the one actually seen, or to the separation of a fragment of a cell in a manner that may be witnessed if a very dilute solution of salt be added to the intestinal cells, for then frequently an elevation of some part of the wall takes place which is perfectly transparent, and only distinguished from the surrounding fluid by a very delicate outline; this rapidly increases, and after a short time detaches itself and floats freely in the surrounding fluid. The contour of the cell from which it has separated remaining as sharply defined as before, the detached masses are known as the "albuminous balls," or "mucus balls" of Donders. In some instances these "balls" contain granular cell contents, or actually the nucleus of the cell, and in such instances we must admit with Reichert, that some damage has been done to the original cell. The seam apparent at the base of the cells has attracted much attention, some thinking it was due to a thickening of the cell wall; others that it formed part of the contents of the cells; others saw fine lines which were supposed to be pores running through it, constituting passages through which the oleaginous constituents of our food might enter. But Dönitz thinks there is no evidence of this, since such a seam appears in the cells of the gall bladder (Virchow), and in the epithelium of the Ammocœtes (Leuckhart). Others, again, have regarded the stripings of the basal seam as being merely the expression of wrinkles, whilst others have looked upon them as the indication of rods or cilia-formed bodies bordering the edge of the cells. This opinion was held by Brettauer and Steinach, but Dönitz thinks it may be only illusory, whilst an experiment of their own seems to him to negative the idea, since with the expansion of the cell by imbibition the seam grew smaller. Notwithstanding the fact that true ciliated epithelium has been observed in the Branchiostoma lubricum by Müller and Retzius, in Petromyzon and in sharks (in fœtal life) by Leydig, in eels and various radiate animals by Kölliker, and in fowls and ducks (five to ten weeks of age), in the cœcum and diverticulum ilii by Eberth, Dönitz himself regards the basal seam as something accidental, as a secretion of the cells, as it was formerly considered to be by Wiegandt and Reichert, for it is frequently absent; it often appears on one alone out of a row; and sometimes in a whole series it seems occasionally to pass directly into intestinal mucus, whilst the farther it extends from the cell the softer and looser it becomes. It frequently also includes fat drops, which are more abundant the greater the distance from the cell, showing its want of consistency at that part. As regards the cross-striping it is often not regular and is sometimes absent, and is attributable merely to the separation of the secretion of the cell or basal seam, giving rise to the appearance of pores or canals.

3. M. Thiry describes a mode of making an intestinal fistula. He finds that under ordinary circumstances there is scarcely any secretion from the intestinal glands. It may, however, be called forth by mechanical irritation, or more feebly by a solution of 0·1 per cent. of hydrochloric acid. From a portion of the intestinal surface equal in extent to 30 square centimètres, he obtained about one drachm of intestinal fluid in one hour. It presented the appearance of a limpid, clear, wine-yellow fluid, possessing a strong alkaline reaction, and contained nearly one per cent. of an albuminous substance. The specific gravity was very constant, and amounted to 1·0115. The intestinal fluid of the dog had no action on starch or fat; it dissolved fibrin, but appeared to have little solvent power on coagulated albumen or fresh muscle.

4. According to Hoppe, in the bile of the dog the only biliary acid present is the taurocholic. In the transit of this substance through the intestinal canal it appears to undergo decomposition; and part, at least, is thrown out with the fæces in the form of cholalic acid. The decomposition commences in the small intestine, but takes place most actively in the colon; and probably results not from the action of any of the intestinal secretions, but from the fermenting or putrefactive condition of the food. No biliary acids could be detected in the chyle, yet the quantity of cholalic acid found in the fæces was much less than the quantity of taurocholic acid secreted in a given time by the animal. From hence it would seem that the biliary constituents are altered in their passage through the intestines, and are partly reabsorbed, partly eliminated.

5. Röhrig's experiments show that absorption of cholate of soda will take place when a solution of that salt is injected into the rectum, for depressing and even fatal effects resulted. When, however, a similar solution was injected into the jejunum, the lowering action of the salt on the heart was not perceptible, and no ill effects ensued, showing that, as in Hoppe's experiments, some change was effected in the biliary acid as it passed down the intestinal tract, which had the effect of rendering it innocuous.

VII. Secretion.

Dr. J. C. Lehmann: *On Albuminuria induced by the Injection of White of Egg into the Blood.* (Virchow's Archiv f. Path. Anat., 1864, Bd. xxx. pp. 593.)

Lehmann observes that the production of transient albuminuria from the injection of white of egg into the blood, observed by Bernard, has been lately substantiated by Stokvis. On repeating the experiments in question, Lehmann first took great care that the albuminuria should not proceed from any increase of pressure in the vessels—a point previously unattended to, the injection being accomplished very slowly, and with frequent interruptions. He employed a solution containing two per cent. of carefully-filtered albumen, and into the crural veins of one dog injected 28 c. cm., and into that of another the same quantity, after the previous withdrawal of an equal amount of blood. In a third, 20 c. cm. of a 4·1 per cent. solution of albumen were injected by the jugular vein. In all three experiments the urine speedily contained albumen in abundance. In the third dog, ·82 gr. of solid albumen were injected altogether, and 0·63 gr. appeared again in the urine. In all instances the whole, or nearly the whole, was discharged during the first twenty-four hours. In a fourth dog the experiment was unsatisfactory; it sickened and died from emboli in the pulmonary vessels. In a fifth animal the quantity of albumen eliminated considerably surpassed that injected, and the discharge of albumen with the urine continued for several days. In the next place, Lehmann endeavoured to determine whether white of egg alone produced albuminuria when injected, for Stokvis had found that cautious injection of serum or defibrinated blood produced no such effect; and though Bernard had observed it to occur, the result in his experiments might possibly have been attributable to the mere increase of pressure resulting from too rapid injection. To test the validity of this explanation, Lehmann therefore very cautiously injected in one instance a solution of albuminate of soda; in another, a solution of syntonin; in another, a solution of Kühne's myosin; in a fourth, a solution of blood fibrin; and in a fifth, a solution of one gramme of peploin; but in none of these did albumen appear in the urine, nor was the peploin in the last instance eliminated, as was determined by special experiment: hence it is clearly shown, that it is only the albumen of the fowl's egg which thus passes out by the kidneys. Stokvis, moreover, showed that continuous feeding on albumen produced albuminuria.[1] Lehmann, however, found, after the administration of 200 grammes of albumen to a dog, that only a trace was present in the urine.

HALF-YEARLY REPORT ON MATERIA MEDICA AND THERAPEUTICS.

By Robert Hunter Semple, M.D.

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I. *On the Evidence against the Use of Mercury in Syphilis and other Diseases.* By John Hjaltelin, M.D., of Iceland. (Edinburgh Medical Journal, November, 1864.)

Dr. Hjaltelin, who remembers the controversy in Germany twenty years ago, between the mercurialists and the anti-mercurialists, takes the part of the former; and writing from his own experience, he expresses his opinion that it is very dangerous to treat syphilis without mercury. He admits that there are many ulcers of the genital organs which are not really syphilitic, and may be cured by mere cleanliness; but when the syphilitic poison has been absorbed into the system, he thinks the mercurial treatment of the highest value. He states that he has witnessed so many unsuccessful trials with the Epsom salts cure (the Entziehungskur of Fricke), that he wonders why medical men have so long tolerated that treatment. Dr. Hjaltelin considers that the failure of the non-mercurial treatment is well proved from his experience in Iceland, for in that island there is no endemic syphilis, owing to the strict laws which are in force; but many cases have come under his notice of Icelanders being apparently cured in other countries by the Entziehungskur, and being afterwards attacked with the most dangerous secondary and tertiary affections, which yielded only to the judicious use of mercury. In reference to Professor Syme's opinion, that the ravages of syphilis are due to the mercurial treatment, Dr. Hjaltelin asks how the spread of the malady can be accounted for in Naples in the years 1494–98, when mercury was not employed as an antisyphilitic remedy. While writing the present paper, Dr. Hjaltelin saw a sailor who had been treated for a primitive chancre by caustic and Epsom salts, and discharged as cured from a large foreign hospital, but who, after two months' treatment, was seized with the most frightful symptoms of secondary syphilis.

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[1] See also Hammond, Experiments on Food, &c.

II. *On the Local Employment of Iodine in its Pure State in the Treatment of Inflamed Scrofulous Cervical Glands, and of Inflamed Inguinal Glands from Syphilis.* (Comptes Rendus de l'Académie de Médecine, Sept. 1864.)

Under the above title, Dr. Prieur has addressed to the Academy a memoir, of which M. Ricord reports in favourable terms. The proceeding consists in applying to the enlarged glands laminæ of iodine, enclosed in a layer of wadding, where they are rapidly vaporized under the influence of heat. The iodine ought to be spread as uniformly as possible, over the half to a third, or a quarter, of the thickness of the wadding, which should be covered or fringed with a leaf of gelatine, the circumference of which adheres to the skin, and concentrates the iodine vapours to a determinate point. The apparatus is left in its place for from twenty-four to forty-eight hours, and the result is a phlyctena filled with a thick purulent, or bloody serosity. Dr. Prieur states that he has treated in ten years about one hundred and twenty patients by this plan, and has thus caused the disappearance of more than three hundred swellings. M. Ricord, in reporting on the paper, regrets that in speaking of the inguinal swellings, the author of the memoir has not specified whether he treated inflamed glands symptomatic of infecting chancre, or simply buboes sympathetic of the soft chancre, or even virulent buboes. But the inguinal region, like the neck, is the chosen seat of strumous swellings, and often a chancre or blennorrhagia is only the occasion of the development of these enlargements. M. Ricord has himself tried the plan of Dr. Prieur in eight cases of well-marked scrofulous adenitis, and the results he has obtained have been confirmatory of the success of the treatment.

III. *On the Employment of Benzine in Trichiniasis.* By Professor MOSLER. (Berliner Klinische Wochenschrift, 1864.)

In a work on intestinal worms, Professor Mosler has pointed out the poisonous influence exerted upon trichinæ by benzine. This substance was formerly obtained by distilling benzoic acid with lime, but is now procured in the preparation of coal naphtha. There seems to be no doubt that benzine destroys the trichina, but it is also poisonous to the animal infested by the parasite. It was therefore a question with Dr. Mosler, whether in the human subject, doses of benzine might not be given, which, without being poisonous to the patient, would prove a remedy for trichiniasis. After performing several experiments on the lower animals, Dr. Mosler was enabled to study the question in the human subject during an epidemic of trichiniasis, which occurred at Quedlinberg last year. The benzine treatment was adopted by giving benzine ʒij. with liquorice juice and mucilage of gum-arabic, of each ℥j., and peppermint water ℥iv. Of this mixture a tablespoonful was given every one or two hours, and in this form the benzine was well borne. Dr. Mosler was satisfied that none of the patients experienced any bad effects from the remedy. His conclusions on the subject are as follows: Benzine holds the first place among anthelmintic remedies, and may be administered to the human subject with safety, in larger doses than was formerly thought possible; given in doses, which are well borne by the human organism, it kills the trichinæ in the intestinal canal, and so prevents the propagation of the parasites; and therefore benzine is the only rational treatment to be employed in the trichina disease in man.

IV. *A Case showing the Effects of the Calabar Bean as an Antidote to Poisoning by Atropia.* By Dr. KLEINWACHTER. (Berliner Klinische Wochenschrift, 1864.)

In the ophthalmic department of the hospital at Prague last August, four boys, engaged in cleaning the room, drank a portion of a solution of atropia, thinking that it contained spirits. Two of the boys either spat out or vomited the fluid and exhibited no symptoms of poisoning, but the two others who did not vomit were distinctly poisoned—one, however, much more so than the other. The symptoms were those of poisoning by belladonna, and consisted of delirium, dilatation of the pupils, feeble pulse, and in one there was coma, alternating with furious delirium. Both the patients were taken to bed, one of them being restrained in a strait-jacket, and cold lotions were placed on their heads. Dr. Kleinwächter happened accidentally to have with him a solution of the Calabar bean extract in glycerine, and, by way of experiment, he gave to the patient who was the most affected, 10 drops of the solution (6 grains of extract to 1 drachm of glycerine), which in about a quarter of an hour produced violent vomiting. The pulse became stronger and quicker, rose to 75 and then to 80 in the minute, the temperature of the body fell, the delirium abated, the patient became more quiet, consciousness returned, urine was passed with some pain in the urethra, and the pupils became somewhat contracted. In the case of the other patient, who was less affected, some of the extract of the Calabar bean was dropped into the eye, but without any good effect, for on the next day the symptoms were almost unchanged, while the patient who had taken the solution of the Calabar bean internally, had almost completely recovered. The rapid and striking improvement in one of these cases appears manifestly to be attributable to the administration of the Calabar bean extract, for the patient who was not treated in the same manner showed no improvement for forty-eight hours.

V. *On the Preparation of Chloroform for Anæsthèsia.* By M. ADRIAN. (Bulletin Général de Thérapeutique, Oct. 30th, 1864.)

M. Adrian, who is a pharmaceutical chemist, observes that there are many impurities in much of the chloroform sold in the present day, such as alcohol, chlorine, hydrochloric acid, ether, and compounds of methyle, aldehyde, water, fixed matters, &c. Some of these substances are easily recognised by chemical agents, but others which resemble chloroform itself can only be detected by a careful examination. M. Adrian, having had occasion to purify some of the chloroform required in his establishment, has found that the complete absence of foreign matters sensible to reagents was not a sufficient indication of purity, and he proposes the following processes for rendering the anæsthetic perfectly pure. It should first be shaken with water to remove the alcohol, and these washings should be repeated several times, and the complete absence of water should be proved by chromic acid and recently prepared binitrosulphuret of iron, the former of which is not decomposed, and the latter remains insoluble when the chloroform is quite free from alcohol. The water also removes any aldehyde which may be present. When the chlorine and its derivatives have been for the most part removed by the previous processes, the chloroform is put in contact with a weak solution of carbonate of soda, which saturates the last traces of chlorine, as well as the hydrochloric and hypochlorous acids which may remain in solution. The water retained in the solution by the chloroform is removed by digestion for twenty-four or forty-eight hours with chloride of calcium, and a considerable quantity of this salt must be used, and the process repeated at several intervals. After this purification, the density and the boiling-point of the chloroform should be accurately determined in order to secure the complete absence of the chlorides of methyle. If the point of ebullition exceeds the sixty-first degree, and rises, as M. Adrian has seen, to the sixty-eighth (Centigrade), the chloroform must be subjected to another series of rectifications.

VI. 1. *On the Hypnotic Properties of the Bromide of Potassium.* By Dr. Debout. (Bulletin Général de Thérapeutique, August 15th, 1864.)

2. *On the Action of the Bromide of Potassium.* (L'Union Médicale, October 13th, 1864.)

1. Dr. Debout relates several cases in which great irritability was relieved by means of the bromide of potassium. In one case there was a stricture of the urethra, which resisted the treatment by dilatation, because the irritability and febrile excitement were so great as to prohibit the introduction of the catheter with sufficient frequency and regularity. Dr. Debout was therefore induced to employ the bromide, in order, if possible, to cause anæsthesia of the urethral canal, so as to make it insensible to the injurious effects of the catheters. The salt was given in large doses, four grammes (about ʒj) being taken every day. The success of the treatment exceeded all expectation, for as soon as the bromide had been taken, the catheters could be introduced, of greater and greater dimensions, without producing any bad symptoms. The most remarkable circumstance in the case was the stupefying action produced by the bromide, for although the patient had been unable to sleep for a month previous to the treatment, yet as soon as it was administered, and when he had taken only about half a drachm of the salt, he slept all night. Another case was one of neuralgia of the neck of the bladder, preventing the patient, who was a medical man, from riding on horseback and visiting his patients, the nature of the roads preventing him from walking. After a month's trial he lost the painful sensations of which he complained, and resumed his usual avocations; he stated also that he had proved the hypnotic properties of the bromide. In another case, the bromide was used to allay an erethism of the pharynx and the neck of the bladder, and the patient was obliged to leave it off, because fifteen grains dissolved in water not only procured him sound sleep during the night, but on the next day he remained in such a state of somnolence as to be unable to attend to his business.

2. In the article in the 'Union Médicale,' the therapeutical properties of the bromide of potassium are described at considerable length, and the results obtained both in England and France are recorded.

Considered at first as a medicine acting specifically in diphtheria and photophobia, and as an anaphrodisiac and narcotic, it has now become recognised as a powerful general and local sedative of the nervous system. M. Gubler, after successfully employing it, from its elective action on the mucous membrane of the fauces, in the granular or glandular sore throat of phthisical patients, has extended its use to all the painful affections of this region, independent of tuberculosis. For instance, dysphagia and herpes of the throat have been relieved by its use, as well as the spasmodic cough of hysteria, phthisis, &c. It would probably also be efficacious in hooping-cough, like bromide of ammonium. It might, perhaps, be used as a gargle in these cases, if its contact were prolonged. This local action has been made available also in moderating the irritability aad excitement of this region in cases of laryngoscopic examination and in operations on the sensitive organs of speech. A solution of the salt, in the dose of 10 grammes (about 2½ drachms) to 150 of distilled water, a tablespoonful night and morning, was employed by M. Gubler in a case of relapsing chorea, and produced a well-marked improvement in two days; and in another case of the same disease the effect was equally beneficial. The same physician has also employed the remedy with success in affections characterized either by congestion of the brain, or the excito-motory power of the spinal cord, in which the usual remedies, as arsenic, belladonna, or atropine, had failed. One patient had attacks of congestion in the head, vertigo, and palpitations, connected with prolonged intellectual fatigue; in a second case, these symptoms coincided with a general excitement and priapism; in a third, the patient was affected with general nervousness and diabetes; and all three were relieved in a remarkable manner. A case of spinal paralysis, with tetanic contractions, was also improved.

The writer in the 'Union Médicale' does not admit that the bromide of potassium is a true hypnotic, but considers that it causes sleep by the deep sedative effect it produces upon the whole of the nervous system, and secondarily on the circulation. Phthisical patients, tormented by coughing and sweating, notwithstanding the use of opium, have obtained sleep by the means alluded to; and in two cases of organic disease of the heart, with rapidity and intermission of the pulse, precordial anxiety and dyspnœa, M. Gubler was able, by means of the bromide, to reduce the pulse from 108 to 76, and to relieve the dyspnœa.

The properties of this salt may be summed up by stating that it is a simple moderator of nervous excitement, and that its elective action is specially exerted on the internal integument, the mucous membrane of the isthmus of the throat, that of the pharynx and that of the genital passages. M. Vigouroux considers it the remedy *par excellence* for the nervous complaints which are so common in large cities, and the cause of which appears to him to be the excess of vascularity of a part of the nervous centres. The bromide, by diminishing the vascularity, becomes the antidote to this condition. Its presence in certain mineral springs explains their sedative action, and these springs may be usefully employed now that the cause of their action is known. Its operation appears to be antagonistic to that of iodine, with which it ought not, therefore, to be therapeutically associated, unless it is intended to counteract the effects of the latter.

VII. *On the Employment of Mercurial Collodion in the Abortive Treatment of Zona.* By Dr. Devergie. (Bul. Gén. de Thérap., July 15th, 1864.)

Zona is not in general a serious disease, and when the eruption has appeared, the diagnosis is easy. It is preceded by darting pains, the intensity of which is in proportion to the extent of the affection; but these pains disappear almost entirely with the appearance of the eruption, although they return during convalescence, and sometimes last for months. It is only in old age and in youth that these nervous disturbances are displayed in great intensity, and in some old persons the pains offer a serious obstacle to the restoration of health, and the bullæ are converted into deep ulcerations very difficult to heal. From a consideration of these circumstances, Dr. Devergie, although generally in favour of promoting rather than arresting the progress of an eruption, is induced to recommend the abortive plan of Dr. Debout, consisting in the employment of a compound of elastic collodion and bichloride of mercury in the form of a liquid, which is made by means of a camel's-hair brush to cover the painful surface. The liquid rapidly dries and forms a shining, resisting layer on each group of bullæ resting on an inflamed surface, and in less than twenty-four hours the train of symptoms has all disappeared, the bullæ have subsided, the liquid they contained is absorbed, and the inflammation is at an end. The next day another application may be made, if it has not been sufficiently successful on the first occasion. The disease is thus made to abort in twenty-four hours when the eruption is recent, but several applications are required when it is of longer standing or more intense. This plan not only succeeds in arresting the course of the zona, but it also preserves the patient against the consecutive pains, or at least diminishes their intensity.

VIII. *On the Use of Brandy in Phthisis.* By Dr. A. Tripier. (Bulletin Général de Thérap., July 15th, 1864.)

Dr. Tripier was at first induced to employ brandy in phthisis in order to allay the vomiting frequently caused after meals by the cough of phthisical patients, and his practice was founded upon the observation he had made, that brandy injected into the stomach of a dog arrested the process of digestion. He therefore inferred that a retardation of the digestive process in phthisical patients might obviate the cough which this process is apt to induce, and the results justified his expectations. He adduces three cases in which vomiting was allayed by this plan; and having thus proved the utility of the spirit to this extent, he proceeds to inquire whether brandy might not be useful in the general treatment of phthisis. He has found in his own practice and in that of some of his friends that drunkards were not phthisical, while phthisical patients who drank alcohol went through the phases of the malady so slowly, that those who had not watched the auscultatory signs suspected that there had been, at first, an error in diagnosis. A communication, embodying these views, was addressed to the Académie des Sciences in January last, and a few days afterwards there appeared a paper in the 'Allgemeine Wiener Medizinische Zeitung,' by Dr. Kempf, on the treatment of pulmonary tubercle by rum. This writer, who had been struck by the cure of a phthisical friend by means of rum, argues, both from theoretical and practical considerations, that alcohol, introduced into the blood, is the only means of curing phthisis in the first stage, and at the beginning of the second. He believes that in phthisis there is a predominance of oxygen in the blood, and that the best plan is to introduce carbon into that fluid; and that, as alcohol is a hydro-carbon, it is well suited to the purpose. Dr. Kempf also adduces some successful cases, drawn from the results of practice.

IX. *On the Therapeutical Applications of Carbolic Acid.* By Dr. James Watson. (Edinburgh Medical Journal, Sept., 1864.)

Carbolic acid, or phenol, one of the principles of coal-tar, has been employed for several therapeutical purposes with advantage, and the success which has attended its use in the treatment of favus seems to show that it will prove a powerful agent in destroying the parasites in other skin diseases. Dr. Watson, among other remarks on the uses of carbolic acid, recommends it as a substitute for creasote in cleaning out the carious cavity of a bad tooth. The two substances are very nearly allied; but while pure creasote is difficult to prepare, and rarely to be obtained, pure carbolic acid can be procured from any respectable druggist. Dr. Watson never found creasote to allay toothache, but he has repeatedly known carbolic acid to do so. [We believe that a great part of the creasote found in commerce is nothing but more or less pure carbolic acid. —Rep.] Dr. Watson relates a case of alopecia areata successfully treated by carbolic acid. The patient, a female, suffered from a severe attack of tic-douloureux in the crown of the head, and at the same time a small patch of the scalp became bald. This bald portion was painted with blistering fluid, which relieved the neuralgia, but the baldness extended and became complete, notwithstanding the repeated application of the blistering fluid. The scalp was now nearly covered with a crust resulting from the blisters, and was therefore poulticed for two or three days, the crust being thus removed. Dr. Watson now began the application of carbolic acid dissolved in glycerine, in the proportion of one drachm of the acid to three ounces of glycerine, and this lotion was used night and morning. It should be mentioned that the patient had been suffering from constitutional symptoms, for which she was appropriately treated with tonics and alteratives. Under the combined constitutional and local treatment the general health began to improve, and by a continuance of the same plan for about seven months the scalp was restored to perfect health, and was at length covered with abundance of hair.

X. *On the Employment of Wine in Large Doses in the Treatment of the Infectious Form of Diphtheria.* By Dr. BRICHETEAU. (Bulletin Général de Thérapeutique, Sept. 30th, 1864.)

Dr. Bricheteau having seen a case of diphtheria in which a child was apparently rescued from death by the use of wine in large doses, publishes the details in order to draw attention to the success of this mode of treatment, which, although now extensively adopted in England, has not hitherto been very popular in France. The case was that of a child three years old, attacked with all the symptoms of diphtheria, at last threatening suffocation, for which tracheotomy was performed at the Hôpital des Enfants in Paris. The urgent symptoms were relieved by the operation, but for several days the child remained in a very critical condition from weakness, prostration, and difficulty of breathing, while the diphtheritic patches were still produced. Under these circumstances Dr. Bricheteau ordered wine to be given in as large quantities as the child could take; and accordingly a bottle of Bordeaux wine. with 50 grammes of brandy (about 12½ drachms), were administered in twenty-four hours, and the same quantity was given the next day. In the succeeding twenty-four hours a bottle and a half of wine were given, with 50 grammes of rum; this kind of treatment, somewhat varying the proportions of wine and spirit, was continued for a few days longer, and eventually the patient took food, the diphtheritic symptoms disappeared, and perfect health was restored. The wine at first seems to have supplied the place of food, which was refused by the child; but, as the appetite returned, the wine was diminished in quantity. Dr. Bricheteau remarks that the quantity of wine swallowed by the patient produced no inconvenience; and he does not hesitate to advise, in dangerous cases of infectious diphtheria, the trial of wine from the very commencement of the disease. If the patient refused to drink, it would be necessary to prescribe wine, or in preference alcohol, in the form of injection.

XI. *Treatment of Hooping Cough by the Volatile Matters obtained in the Purification of Coal-gas.* (Mémoires de l'Académie de Médecine, Oct. 1864.)

M. Guérard has lately forwarded to the Medical Society of Hospitals a communication on the treatment of hooping-cough by the emanations from gas-works. Sulphuretted hydrogen and carbonic acid gases are removed from coal-gas by chemical agents, such as lime and oxide of iron; and when these latter have fulfilled their object, they are extracted from the apparatus and exposed in thick layers on the pavement of the yards, and are thus rendered fit to be employed again. When placed in contact with the atmosphere they evolve a large quantity of ammonia, mixed with light volatile oils; and these exhalations, which are very offensive to persons who reside in the neighbourhood of gas-works, have lately become a popular remedy for hooping-cough. A gas-factory at certain hours has resembled the playground of a school, and children affected with hooping-cough are reported to have rapidly recovered after having accidentally passed a few hours in these yards, and others were in consequence brought to the same place in the hope of obtaining similar relief. M. Barthez stated that he had witnessed two cases illustrative of the efficacy of this mode of treatment. The patients were two sisters, aged three and a half and five and a half, suffering from hooping-cough, which had lasted a fortnight in one case, and three weeks in the other. The parents sent the children to the gas-works every day regularly for some hours, and in both cases a cure was effected —in one of the cases three weeks, and in the other four weeks and a half after the first onset of the disease. But Messrs. Blache, Bergeron, Maingault, and Roger, brought forward other cases in which no improvement was obtained by this treatment, and some in which the symptoms were aggravated. M. Guérard, however, conceives that further inquiry is necessary, and that it is not improbable that the gases, which consist mainly of ammonia and volatile oils, may be yet found useful in the treatment of hooping-cough.

XII. *On the Therapeutical Value of the Alkaline and Earthy Sulphites in the Treatment of Catalytic Diseases.* By H. R. de Ricci. (Dublin Quarterly Journal of Medical Science, August, 1864.)

Dr. de Ricci having been very much impressed in favour of the views entertained by Professor Polli, of Milan, as to the action of the sulphites in certain forms of disease, has devoted much time and attention to the investigation of the therapeutic action of these salts. The results have been very encouraging, and he has administered them largely in practice in every case that seemed likely to be benefited by them. The diseases named *zymotic* correspond to those which Dr. de Ricci calls *catalytic*, as he conceives that the latter term does not absolutely involve a principle, as zymotic might do. Professor Polli, being fully convinced of the truth of the catalytic theory of many diseases, endeavoured to discover some means by which the supposed poisons in the blood in such cases might be neutralized and eventually eliminated, without at the same time injuring the blood itself. He had long observed the action of sulphurous acid in arresting fermentation, and he became convinced that this was the anti-catalytic substance he was seeking for. He also found that the alkaline and earthy sulphites have the same property of arresting fermentation and neutralizing catalytic action as sulphurous acid itself, and that moreover they may be safely introduced into the circulation, which is not the case with sulphurous acid. Dr. de Ricci regards this discovery as one of immense value, and thinks that if the sulphites are really able to neutralize the action of catalytic poisons, they might arrest the course of all the so-called zymotic diseases, as small-pox, measles, scarlatina, typhus, &c. He first tried the sulphites on himself, and found them perfectly harmless, even in doses of a scruple, five or six times a day; and their administration to patients was never attended with any inconvenience, and often seemed to be decidedly beneficial. Dr. de Ricci relates four cases in illustration of his views, two of the cases being measles, one infection from an animal poison, and one a poisoned wound. In the two latter the disease clearly resulted from the operation of a poisonous element in the blood, and both were treated solely by the sulphites, and they completely recovered. In one of these cases the disease seemed to be caused by the inhalation of poisonous gases from a decomposing human body, and in the other by the stinging of a gardener's hand by a cactus plant.

XIII. *On the Use of Tartar Emetic and Chlorate of Potash in Croup.* By M. Notta. (Journal de Médecine et de Chirurgie Pratiques, Aug. 1864.)

M. Notta has paid considerable attention to the effects of medical treatment in croup, and after careful consideration and extensive experience of the subject, he prefers the use of large doses of tartar emetic and of chlorate of potash internally, and of local applications to the pharynx and glottis. [It should be mentioned, that the French school of writers and practitioners regard croup as a form of diphtheria.—Rep.] M. Notta relates four cases of genuine croup cured by internal treatment. In the first, the tonsils were touched night and morning for two days with a strong solution of nitrate of silver, and the child, aged four years, took every half hour a teaspoonful of a four ounce mixture containing eight grains of tartar emetic. Strong beef-tea was given, and every night a drachm of chlorate of potash was administered in barley-water. On the third night a fit of suffocation supervened, which was subdued by the administration of a strong solution of sulphate of copper, given until vomiting was produced. In two other cases, equally satisfactory results were obtained by the same means, but as chlorate of potash alone, and cauterization of the pharynx, are known to be inefficacious, the tartar emetic must be regarded as the curative agent. In the fourth case recorded, tartar emetic alone was employed, and with perfect success. The patient was a child, two years old, previously in good health, and seized with fits of suffocation. Syrup of ipecacuan had been given, and some fragments of membranous tubes had been thrown up. M. Notta gave a very unfavourable prognosis, but advised a tartar emetic mixture (eight grains to three ounces), to be taken in teaspoonfuls every half-hour. By perseverance in this treatment the child threw up false membranes, the breathing became free, and recovery ensued. M. Notta believes that the drug modifies the morbid condition giving rise to the plastic exudation, and that the amount of prostration caused by tartar emetic must have been formerly exaggerated, for no alarming collapse was observed in any one of his patients, who, however, had not been weakened by depletion or abstinence, but, on the contrary, were supported by strong beef-tea given at night. The administration of the tartar emetic precluded the use of nutriment in the day time.

XIV. *On the Employment of Chlorate of Potash in Acute and Chronic Bronchitis.* By Dr. Laborde. (Bulletin Général de Thérapeutique, Oct. 30th, 1864.)

The efficacy of chlorate of potash in the affections of the mouth has induced Dr. Laborde to inquire whether the sphere of action of this remedy does not extend to other parts of the mucous membrane, and whether the diseases of the mucous membrane of the bronchial tubes may not be relieved by its use. Some observations made long ago, and pursued afterwards in bronchial affections, have confirmed Dr. Laborde in the views he formed from the physiological study of this salt, and he now publishes several cases in illustration of his opinions. His cases show, in the first place, the therapeutical action of the chlorate in different forms of idiopathic acute bronchitis, then in chronic catarrhal bronchitis, and, lastly, in symptomatic bronchitis. In all the cases recorded of acute bronchitis, the action of the salt was constant, and was manifested by identical results connected with the expectoration, the morbid sounds, and the improvement of the appetite. In chronic bronchitis the effects of the chlorate were equally satisfactory, but its influence was necessarily not so complete in eradicating the disease as in the acute cases, because in the chronic forms other secondary maladies were often present. Dr. Laborde thinks that his cases prove that the chlorate exercises a decidedly modifying influence over the inflamed bronchial membrane, that idiopathic acute simple catarrhal bronchitis, and even capillary bronchitis, and chronic catarrhal bronchitis, are accessible to the influence of this drug. He states that its action is manifested by a rapid modification of the expectoration, which becomes at first more liquid and diluted, then becomes scanty, and at last is suppressed altogether; and by an almost immediate diminution of the morbid sounds, relief of the cough, and excitement of the appetite. The dose recommended by Dr. Laborde is ten grammes (about two and a half drachms) in the twenty-four hours, given in a pretty large quantity of fluid owing to its somewhat sparing solubility.

XV. *On the Employment of Chloroform in Dental Surgery.* By J. Smith, M.D., F.R.C.S., Surgeon-Dentist to the Royal Infirmary, Edinburgh. (Edinburgh Medical Journal, Nov. 1864.)

In the administration of chloroform in dental surgery, Dr. Smith advises that all preparatory measures should be taken by the operator, such as the arrangement of instruments, &c., before the inhalation is commenced. The patient should be placed on a low couch or sofa raised at one end, and without a back, and no cork or any such substance should be placed between the teeth previous to and during the exhibition of the anæsthetic. In reference to the means of employing the chloroform, Dr. Smith thinks that all kinds of inhalers are objectionable in dental surgery, and that the simplest and safest method of administration is by using a napkin or handkerchief folded several times, so as to prevent the too sudden evaporation of the chloroform. The quantity employed should not be less than a dessert-spoonful at a time, and the chloroform should be renewed when the former supply has passed off. Although Dr. Smith enjoins that previous to, and during the exhibition of, the chloroform, no substance should be placed between the teeth so as to keep the jaws apart, yet after the anæsthesia is complete, it will in general be found necessary to separate the jaws widely, and this may be done pretty easily merely by opening the mouth, for muscular relaxation is one of the effects of the chloroform. But exceptional cases occur where the teeth, and even the lips, are closely and forcibly kept shut, and in such instances some flat body as the handle of a tooth-brush, may be inserted between the front teeth, and then a suitable gag may be introduced between the molar teeth of the side opposite to that to be operated upon. In reference to the question of pulling forward the tongue in certain cases, in order to obviate the risk of suffocation, Dr. Smith thinks the practice objectionable, because, while it leaves the larynx open for the air, it also leaves it open for mucus or blood. He thinks the introduction of the forefinger, thrust well back into the pharynx, so as to clear away the fluids, is all that is necessary in cases where the breathing appears obstructed or arrested, and he states that in the experience of between one and two thousand cases of complete anæsthesia for dental operations, he has never had occasion to resort to any other measures.

XVI. *On the Subcutaneous Injection of Mercury.* By M. Scarenzio, of Pavia. (L'Union Médicale, November 17th, 1864.)

M. Scarenzio, principal clinical professor in the venereal wards of the University of Pavia, has successfully employed hypodermic injections of mercury in constitutional syphilis. As he conceives that calomel is converted into corrosive sublimate, or sublimed by absorption, he suspended it in glycerine or mucilage, and thus injected it beneath the skin with Pravaz's small syringe. He selected as the place of application the internal part of the leg, or, still better, that of the arm, in order to obviate the necessity of the patient's lying down. Sometimes the injection is performed only on one side or on both simultaneously, or at two intervals with some days between them, according to the nature and intensity of the symptoms. Of eight cases treated in this manner, including chancre, periostitis, pains in the bones, gonorrhœa, necrosis, and eczema, only one resisted the remedy, and this one had already been unsuccessfully treated by other mercurial applications. In the seven others the cure was rapid and lasting, and without any concomitant or consecutive bad symptoms. Once only a mercurial stomatitis supervened twenty days after the injection, but this circumstance shows that the mercury is absorbed. In general the beneficial effects of the injections were not exhibited until a week or fortnight afterwards, but when once the improvement began, the cure rapidly followed. The writer in the 'Union Médicale,' in recording this treatment, observes that if its success should be confirmed, its advantage would be manifest, for with a minimum dose, almost homœopathic in quantity, of a specific which alarms all patients, and with a slight puncture, a disease would be rapidly cured, which, at present, always requires a long course of treatment. The question is therefore left to the test of experience, and the method has certainly the merit of great simplicity.

XVII. 1. *Experimental Researches on Opium and its Alkaloïds.* By Professor CLAUDE BERNARD. (Archives Générales de Médecine, October, 1864.)
2. *On the Therapeutical Effects of the Alkaloïds of Opium.* By Dr. OZANAM. (Révue de Thérapeutique Médico-Chirurgicale, October, 1864.)

Both the papers with the above titles were lately presented to the French Academy of Sciences, and the authors agree in thinking that the physiological effects of the alkaloïds contained in opium are not identical, but they do not each arrive at the same conclusion as to what the effects really are.

Prof. Bernard infers from his experiments on the lower animals, that of the six principles of opium—namely, morphia, narceia, codeia, narcotine, papaverina, and thebaina—only the first three possess the property of inducing sleep, the last three being destitute of that property, and probably serving to modify or counteract the soporific effects of the others. But although morphia, narceia, and codeia are narcotics, their effects are not identical, for each causes sleep in a peculiar manner. Prof. Bernard describes at considerable length the differences observed in his experiments on the lower animals between the effects of morphia, codeia, and narceia. Codeia blunts the sensibility much less than morphia, and does not make the nerves sluggish; narceia produces a kind of sleep which resembles that caused both by morphia and codeia, but at the same time is different from that of either. Narceia is the most narcotic of the alkaloïds, but the sleep it produces is characterized by great tranquillity and incapability of being aroused by noise. Prof. Bernard concludes that there are three principal properties in the alkaloïds of opium—namely, soporific, stimulating, and poisonous. With regard to narcotic powers, narceia stands first, morphia second, and codeia third. The three other principles—thebaina, papaverina, and narcotine—do not possess soporific properties. In the order of stimulants, the constituents of opium stand as follows: thebaina, papaverina, narcotine, codeia, morphia, narceia. As poisons, they stand in the following order: thebaina, codeia, papaverina, narceia, morphia, narcotine. Prof. Bernard concludes by observing that as in opium the same plant yields products which have very different actions on the animal economy, we ought no longer to believe that plants of the same family ought necessarily to possess the same physiological properties.

M. Ozanam arrives at different conclusions from those of Prof. Bernard, and investigates the subject from a therapeutical point of view, as he has been engaged in doing for the last ten years. He describes six principal alkaloïds in opium—namely, morphia, codêia, narcotina, opianine, narceia, and thebaina. Morphia is so well known that he says little of its effects. The therapeutical properties of opianine are but little known. Codeia is sometimes an excitant, sometimes a sedative, and sometimes it stupefies, according to the dose. Narcotine has a well-marked stimulant action, and produces an effect the reverse of that of morphia. Thebaina is an excitant of the cervical part of the spinal cord. Narceia is a valuable sedative, and appears to have a special action on the lumbar portion of the spinal cord. Thus opium is both a sedative and a stimulant; the morphia, the opianine, and the narceia are sedative; the narcotine and the thebaina are stimulant, and codeia stands between the two, partaking of both properties according to the dose.

XVIII. *On the Therapeutical Uses of Ox-gall.* By Prof. WOLFF. (Schmidt's Jahrbücher der In- und Ausländischen Gesammten Medicin, October, 1864.)

Prof. Wolff wishes to direct the attention of the medical public to a renewed trial of ox-gall, so that it may again effect the purposes for which it was formerly recommended. The ox-gall acts as a tonic, laxative, and nervine. As a tonic it is especially useful in dyspeptic cases dependent on atony of the gastro-intestinal canal; as a laxative when a powerful stimulation of the intestine is at the same time required, and in cases of deficient and morbid secretion of bile with attendant constipation. In such cases ox-gall is more useful than any other medicine recommended for the same conditions, and a patient who was treated by Dr. Wolff for symptoms of cirrhosis of the liver, jaundiced skin, obstinate constipation, and increasing emaciation, was completely cured by the use of this agent. Dr. Wolff also found this remedy very beneficial in two cases of spasm of the stomach in an especially severe form. In order to produce a laxative effect he ordered a tablespoonful of a solution of from four to six drachms of inspissated ox-gall in six ounces of aromatic fluid, to be taken four times a day; but to produce a tonic effect smaller doses are sufficient.

XIX. *On the Use of Apiol in Dysmenorrhœa.* By Dr. MAROTTE, of the Hôpital de la Pitié, Paris. (Journal de Médecine et de Chirurgie Pratiques, February, 1864.)

Apiol, the active principle of the common parsley, the *Apium petroselinum*, although strongly recommended by the late Dr. Joret in amenorrhœa and dysmenorrhœa, is not adapted to the treatment of all such cases, but only to particular forms of them. Dr. Marotte has frequently prescribed apiol for the last three years, and confirms the truth of Dr. Joret's views as to the efficacy of this drug in certain specified conditions of uterine irregularity. He first relates three cases of uncomplicated amenorrhœa in which the apiol was given with advantage, and he then adduces an instance where it was efficacious even when the amenorrhœa had been preceded by dysmenorrhœa. But where the amenorrhœa depends upon an inflammatory condition of the parts, apiol does not appear to be of any service. It is beneficial only when the pains coincident with menstruation depend on that form of dysmenorrhœa which is consequent on neuralgia of the vaso-motor system of the womb. It has no sedative effect on the neuralgic pains situated in the branches of the sacro-lumbar nerves, but will be found more especially useful in uncomplicated amenorrhœa when the only obvious indication is to stimulate the uterine vaso-motor nerves, and, through their agency, the capillaries of the viscus. It is also useful in dysmenorrhœa, unconnected with any mechanical obstruction or any diseased conditions of the womb, such as plethora, congestion, or metritis. When the disturbance of the uterine functions is occasioned by plethora, anæmia, or debility, the beneficial effects of apiol will be apparent only after these morbid states have been remedied. Thus, in the case of a lady who was affected with chlorosis and suppression of the menses, no good results were obtained until chalybeates were prescribed simultaneously with apiol, the former by themselves having proved unavailing.

XX. *On the Use of the Valerianate of Atropia in certain forms of Epileptic Disease.* By Dr. Michéa, of Paris. (Journal de Médecine et de Chirurgie Pratiques, January, 1864.)

Dr. Michéa agrees with Marshall Hall and Brown-Séquard in placing the seat of epilepsy in the medulla oblongata, and as he has found that atropia has a sedative action on the spinal cord, and reduces the undue excitement of that part, he conceives that the exhibition of atropia is the rational treatment of that disease. Belladonna is considered by Dr. Michéa as inferior in efficacy to atropia, which he prescribes in combination with valerianic acid in the following formula—viz., one-third of a grain of valerianate of atropia with a sufficient quantity of confection of roses, to be divided into twenty pills. One pill is at first taken daily for a week, when the dose may be increased to two, which must not be exceeded. The pills should be alternately taken and discontinued for a fortnight at a time for several months, and even a year or more, if necessary.

XXI. *On the Use of Phosphate of Lime in Periostitis.* (From the 'Journal de Chimie Médicale,' 1863.)

The 'Journal de Chimie Médicale' relates two cases of periostitis in which Professor Piorry employed the phosphate of lime with benefit. In one patient the seats of disease were the tibia and the humerus, where there were circumscribed swelling and night-pains. The complaint seemed to have a syphilitic origin, and Professor Piorry prescribed half a grain of protiodide of mercury night and morning, fifteen grains of iodide of potassium three times a day, and the application of anodyne poultices. This treatment was continued for three weeks without success, when M. Piorry, taking into account the swollen and softened condition of the bones, thought that the combination of two drachms of phosphate of lime given daily with the iodide of mercury might prove beneficial. This treatment was therefore adopted, and was attended with success; the swellings of the bones diminished, and in a week disappeared altogether. The patient being a weak and anæmic subject, tonics and generous diet were prescribed at the same time. In another patient the seat of disease was the left temporal region, where there was excruciating pain, at first attributed to neuralgia of the fifth pair of nerves, and treated unsuccessfully by blisters dressed with morphia, and by the internal use of belladonna and opium. On close examination, M. Piorry discovered the true nature of the case, which was a considerable periosteal tumour at the base of the parietal bone. There was no reason to suspect any syphilitic taint in this case. A drachm of phosphate of lime was ordered night and morning, and the pains decreased in the course of four days, and in a short time an entire cure was effected. The editor of the 'Journal de Chimie Médicale' states that the phosphate of lime which ought to be employed is that which is obtained by precipitating, by means of ammonia, the phosphate in solution in hydrochloric acid; the deposit should be carefully washed and preserved in a moist condition.

HALF-YEARLY REPORT ON PATHOLOGY AND PRINCIPLES AND PRACTICE OF MEDICINE.

By Francis C. Webb, M.D., F.L.S.,
Member of the Royal College of Physicians, Physician to the Great Northern Hospital.

I. *Two Cases of Ague, with Remarks on the Same.* By Joseph Bartlett, M.R.C.S., and Sydney Ringer, M.D. (Edinburgh Medical Journal, Oct., 1864.)

The authors state that they publish these cases as proving "that fits of ague may occur, which are indicated only by an alteration in the temperature of the body, all the other symptoms being entirely absent; and further, as proving that where symptoms do occur which might lead to the suspicion of a fit, the temperature of the body is the only true test of the severity of the attack." The first case was that of a sailor, aged 16. He had contracted ague on board ship about nine months previously, and had suffered from it ever since.. He was admitted into University College Hospital, under Dr. Jenner, on June 20th. "At the time of his admission he was very pale, but not very thin, though he stated that he had lost much flesh. He could walk about the ward without much fatigue. His complexion was very muddy; his spleen reached anteriorly to the umbilicus, and downwards almost to the crest of the ilium. His liver was not increased in size. There was a loud systolic murmur at the apex of the heart, a systolic and diastolic murmur at the base, and a loud venous hum audible over the veins of the neck. Moreover, a systolic murmur could be easily produced by pressure on the carotid arteries. There was no œdema of the body. No quinine was given him whilst he was under observation." On the 22nd of June a well-marked fit occurred, with a cold, hot, and sweating stage. His temperature rose to $104\frac{3}{5}$. On the 23rd, 24th, 25th, and 26th the temperature only rose to 99; on the 27th the temperature rose to $101\frac{1}{5}$. On the 28th it reached $102\frac{3}{5}$; on the 29th, $101\frac{1}{5}$; on the 30th, $99\frac{3}{5}$; on 1st of July, 98. During these attacks he had no rigors nor any sensation of heat; indeed, he expressed himself as feeling quite well. He took food freely, and was only kept in bed that the observations might be made. There was no excess of white corpuscles in the blood, nor any albumen in the urine. After the above fits he took quinine, and diminution in the size of the spleen quickly followed. The second case was that of a child, aged five, who had taken ague at Antwerp when three months old, and had suffered from the disease, with some intermissions, ever since. He was admitted into University College Hospital on 13th June, under Dr. Hare. Careful notes of the general state of the patient and of the temperature of the body were taken daily for fifty-two days. On fifteen of these days the temperature rose to 100 and upwards. "Thus the elevation of the temperature was very considerable on several occasions. On two of these—namely, when the temperature rose to $105\frac{2}{5}$ and to 105, the child had slight lividity of his hands, and complained on one occasion of feeling cold." On no other occasion were there any symptoms to indicate that the child was indisposed, except some drowsiness and loss of appetite. The blood contained no excess of white corpuscles; the urine frequently contained a small amount of albumen. The authors conclude that fits of ague may occur which are only indicated by elevation of temperature, and that the other symptoms, when present, are by no means necessarily proportioned to the severity of the fit. Correct information as to the existence and severity of the fit can only be obtained by the thermometer. This fact may probably explain the recurrence of the disease in many cases in which it was presumed to be cured. The thermometer is the best guide as to the period when quinine may be discontinued.

II. *Meningitis Spinalis cured by Curara.* By Dr. LANDENBERGER. Würtemberger Corr. Bl. xxxiv. 21, 1864. (Schmidt's Jahrb., Band cxxiv., No. 10, p. 25, 1864.)

The following case is worthy of record as an instance of the efficacy of curara, though, as the editor of "Schmidt's Jahrbücher" observes, it appears to be a case of hysteria rather than of meningitis spinalis :—

A powerful man, aged twenty-seven, after having been out of sorts for some time, fell ill with serious disturbance of the respiration, and uninterrupted dry hysterical cough, the thoracic viscera being perfectly normal. Shortly after he had pain in the left hypochondrium, with tenderness on pressure over the lower vertebræ, which soon spread to the whole spinal column, and the pain affected the left half of the body. This varied in severity and extent, and analgasia often alternated with pain, especially in the lower part of the thigh. Later in the course of the disease spasms, for the most part accompanied and followed by fits of coughing, came on, at first in the left arm, tonic in the beginning, then clonic, and later changing to opisthotonos, and ending in shudderings of the whole body. The muscles of the face were sometimes implicated; more often the larynx and throat; there was no trismus. The spasms were painless, and lasted from fifteen to seventy-five minutes. Then followed a pause of varying duration, in which the pulse, which had sunk to 30–40, rose again to 70–80. There was no fever throughout. The right half of the body was never sensibly disordered. At times there was delirium. The hyperæsthesia of the left half of the body was accompanied by great increase of the reflex sensibility, the analgasia of the lower thigh with paralysis. This state lasted, with short intervals in which the patient felt quite well, more than a month, and withstood local and general derivatives, opium, quinine, camphor, and tepid baths. It was then determined to try the endermic application of curara. For three days a quarter of a grain, and for two days one-half grain was sprinkled twice a day on a freshly made wound. On the sixth day, after half a grain had been again used, the spasms, which had been gradually getting weaker, entirely ceased, and paresis of the upper and almost total paralysis of the lower extremities came on; the very frequent and laborious respiration became tranquil and superficial, and appeared at times almost to cease; sometimes fainting came on. This state of things lasted two whole days, then the paralytic symptoms disappeared again under the use of stimulants and opium, slight spasms reappeared, and after heavy perspirations and copious secretion of urine the patient recovered rapidly and perfectly.

III. *An Epidemic of Catalepsy in Billingshausen.* By Dr. VOGT. (Schmidt's Jahrb., Bd. cxx., p. 301; and Würzb. Med. Ztschr., iv. 3, p. 163, 1863.)

The author reports that for some length of time an epidemic of catalepsy has existed in the above-mentioned place, which is near Würzburg, and is inhabited by a peasantry who are well off, but are closely connected by intermarriages. Those attacked, locally termed the rigid ones (*die Starren*), are suddenly seized with a peculiar sensation in the extremities, then the muscles become tense, the countenance deathlike, the posture already taken is preserved, the fingers are crooked, and tremble gently, as also the eyeballs; the visual axes converge, intellect and consciousness are normal, but speech consists only of broken sounds. The attack passes off in from one to five minutes, and the body becomes warm. Cold is generally an exciting cause; otherwise it appears everywhere, and during any kind of occupation; the intensity varies. The catalepsy is hereditary in families, but frequently misses a generation, and is intensified by marriage of two affected persons. Half the dwellers in Billingshausen, men and women alike, suffer from it. All of the inhabitants are small and ill-formed, but not intellectually inferior to their neighbours. The silence hitherto preserved on the subject has social grounds.

IV. *On the Treatment of Diseases of the Air Passages by Pulverized Solutions. Notes in Medicine and Surgery.* No. II. By Dr. PHILIP C. SMYLY. (Dublin Quarterly Journal of Medical Science, November, 1864.)

Dr. Smyly observes that inhalation either of vapours or of air impregnated with various substances is a method of treatment of well-known value, but that the inhalation of various medicinal substances broken into a fine spray is new. It was first employed, in 1857, by Sales Girons, who found it beneficial in pharyngitis, laryngitis, bronchitis, and tuberculosis. Since then it has been frequently tried on the Continent. Dr. Smyly states that fluid impregnated with substances not otherwise volatile can be broken into such fine spray that the solution may be inhaled without inconvenience, and that the medicinal agent may thus be brought in direct contact with the bronchial tubes, even as far as their small ramifications. The instrument used by the author is made by Mr. Krohne, after M. Lewin's. "It consists of a glass chamber, covered with an air-tight brass cap. In this cap a glass tube is fixed, almost touching the bottom of the glass vessel. The end, outside the brass cap, is drawn out to a capillary opening, and bent at an angle. Into another part of the cap an air-pump is screwed, to press air into the chamber, thus forcing any fluid introduced into the chamber through the capillary opening with very great force. A glass cylinder, open at both ends, and having a small round hole in the side, is fixed by means of a metal rod at a short distance, so that the stream from the capillary opening may enter the hole in the side. Opposite this hole a metal button is fixed, on which the stream strikes and is broken into a fine spray which falls out of the cylinder at each end. The patient is then placed opposite one end of the glass cylinder, and by breathing draws a considerable portion of the spray into his air-passages." Dr. Smyly relates the case of a gentleman who consulted him in June, 1864, and in whom the laryngoscope revealed the following condition:—The epiglottis was very red, the mucous membrane between the arytenoïds and the vocal cords was congested and slightly excoriated. The vocal cords were quite white, except towards the sides attached to the larynx. His chief symptom was constant irritation of the throat, preventing sleep and causing great distress. The local application of solution of nitrate of silver by a brush and various gargles had been tried without the slightest good effect. The patient got worse and worse, and could obtain no refreshing sleep. After one application of solution of nitrate of silver (15 grains to the ounce) by the fluid pulverizer, he slept without disturbance from his throat the whole night. After a second inhalation he was so far convalescent as to be able to leave Dublin. He had experienced no relapse on October 13th.

V. *Case of Ileus, accompanied by Fæcal Vomiting, successfully treated by Galvanism directly applied to the Mucous Surface of the Intestine.* By J. M. Finny, L.R.C.S.I., M.B. (Dublin Quarterly Journal of Medical Science, November, 1864.)

The patient, a man aged fifty, was treated in the Meath Hospital in July, 1864, by Dr. Stokes. After swallowing a dose of Epsom salts on June 25th, he was seized with violent pain in the abdomen, obstinate constipation and vomiting—ultimately of fæcal matter. After all the usual means of treatment by opium purgatives, enemata, &c., had failed, Dr. Stokes, on July 6th, determined as a *dernier ressort* to apply the galvanic stimulus to the mucous surface of the intestine. The following is Mr. Finny's account of the manner in which this was accomplished:—"The patient was directed to place himself on his hands and knees, and while in this position, with his buttocks well raised and his head low, I passed up the long tube with the intention of administering a large enema of ordinary house medicine previous to the application of the galvanism. The tube passed up readily as far as seven or eight inches, when it met some obstacle to its progress. On its withdrawal some feculent matter was observed at its end. It was again re-introduced, and by steady pressure and frequent injections it slowly passed through some solid obstacle without at all conveying the idea of elasticity. Once through, it was readily passed up the intestine to its full length, and the remainder of the injection was thrown up. On removal of the syringe there was no escape of flatus or return of the injection. The exhausting syringe was now applied to the external extremity of the tube, but failed in causing any flow through it. Without withdrawing the tube the patient was placed on his side, and one sponge, connected with the negative pole of the electro-galvanic battery, being applied to the margin of the anus, the other sponge, in connexion with the positive pole, was applied in a rapid manner over the whole external surface of the abdominal walls. After a few such applications there was a gush of fluid matter through the tube, which was then withdrawn, and the sponge which had hitherto been applied to the verge of the anus was, along with a portion of the metallic handle to which it was attached, passed up the rectum two or three inches, while the same proceeding as before was renewed with the other sponge. Each sudden application threw the whole of the abdominal muscles into the greatest spasm, and was immediately succeeded by a gush of fluid fæces. Three large basinfuls were thus got rid of. The operation, which had lasted about ten minutes, and which was attended with the most intense agony, so much so that the patient writhed under it to a painful degree, was now suspended, as great prostration of strength had ensued, the patient's pulse becoming almost imperceptible. He soon, however, rallied on the administration of brandy, and expressed himself greatly relieved." It will be sufficient to add that from this time the patient, with the exception of a slight relapse twenty days after the operation, made a good recovery.

VI. *The Picro-nitrate of Potash in Trichinous Disease.*

In 'Schmidt's Jahrb.,' v. cxix, p. 187, Meissner gives a *résumé* of recent contributions to our knowledge of trichinous disease, and continues it in Band cxxiv. pp. 182–194. In the former of the two he notices Fiedler's experiments with picro-nitrate of potash on trichinized rabbits. He found that the picro-nitrate had no effect on the parasites, either in the intestines or in the muscles; that it did not prevent either the development of the embryos or their migrations; and, finally, that if given in large doses it killed the rabbits, but not the trichinæ.[1] Fiedler's opinion of its value was therefore opposed to that of Friedreich. In the second communication Meissner quotes[2] Dr. A. Fiedler and Dr. Kohl's researches into the value of benzoin, which has been recommended by Mosler. They also instituted a series of experiments on trichinized rabbits, and found that large doses of benzoin, given for a long time, are able to kill the trichinæ in the intestines, but that smaller doses have not any deleterious effect on them; that the benzoin, even in the largest doses possible, has not any effect on the trichinæ in the muscles. It is very possible that when, like Mosler, one poisons the animal experimented on with benzoin, the trichinæ in the muscles die; but Fiedler believes from his experiments that benzoin could never attain any practical value as a remedy against trichinæ in the intestines or muscles. The human organism could not bear the large doses that killed the parasite, and smaller doses in nowise hindered its development or its migration. Mosler[3] is, on the contrary, confirmed in his opinion of the value of benzoin by further experiments, and comes to the conclusion that benzoin, which holds the first place among known anthelmintics, can be borne by the human system in larger doses than he at first believed; that in such doses it kills the trichinæ in the intestines, and prevents in great measure the migrations of the embryos, and that therefore it is the only rational means that may and must be employed against trichina disease in man. Mosler, from his later experience, contends that Fiedler's judgment was a somewhat hasty one, and he endeavours to show from Fiedler's report that his experiments really told not against but in favour of the use of benzoin.

VII. *Trichinous Disease in America.* (Buffalo Med. and Surg. Journal, June, 1864; and American Journal of Medical Sciences, July, 1864.)

Trichinous disease has lately been observed in the western part of New York. Dr. L. Krombein gives the following account of some cases seen by him in Cheektowaga:—"T. F., a blacksmith, aged thirty, and his wife, aged twenty, were taken ill simultaneously, the 29th of April, with stiffness of the limbs and the whole body, bloating of the face, with a slight œdema of the eyelids. Soon there followed distinct pains in all the limbs and body, so that they could not bear even the slightest touch. By and by the pains diminished; there set in very laboured respiration and great prostration, combined with very profuse sweats. In the commencement of the illness they had both had slight diarrhœa for a few days, and during the whole course of the sickness they suffered greatly from sleeplessness and unquenchable thirst. The woman, who was in the third month of pregnancy, had aborted on the 12th, and from that time there was œdematous swelling of both lower extremities. Fever in both patients was very high (pulse 138 in the man, 146 in the woman); but the skin was not hot, but rather cool." The man died on the 16th, the woman on the 17th of May. The microscopical examination of the muscles of the thorax, abdomen, and thigh disclosed many trichinæ both in the encysted and free state. The same disease was observed in another family of seven persons, living at a distance of two miles from the above patients. At the time of the report the father and mother were dead, and the remaining members of the family in great danger. In a specimen of muscle from one of these cases a number of free trichinæ were found. Some of the sausage they had eaten was also found to contain a number of the parasites in the encysted state.

[1] Virchow's Arch., p. 573, 1863. [2] From Archiv d. Heilk., Vol. iv., p. 337, 1864. [3] Berliner Klin. Wochenschr., 32, 1864.

VIII. *Distoma Hepaticum in Man.* By Professor A. Biermer, Berne. (Schweizerische Zeitschrift für die Heilkunde; and Gazette Médicale de Paris, Oct. 22nd, 1864.)

The following case is of interest from the rarity of the occurrence of the distoma hepaticum in the human subject:—A soldier, aged forty-three, had jaundice, in 1862, in Sumatra. The disease continued until his return to Europe. He came under treatment on January 5th, 1863. His skin was of a deep yellow colour; there was no hypertrophy of the liver, no fever, hypertrophy of the spleen, bronchial catarrh. Mechanical jaundice from some unknown cause was diagnosed. Some days after, he was attacked with sharp pains in the region of the liver, and violent cough, with sanguinolent sputa and vomiting. There were signs of infiltration of the right lung, and the jaundice was increased. On the 31st of January, an extremely painful diffused swelling of the parotid appeared on the left side, accompanied by intense fever. On the 11th of February, there was sanguineous suffusion in the axillary region, which soon invaded the right side of the thorax, and was accompanied by violent pain. He died on February 18th. The post-mortem disclosed a liver of normal size; the gall bladder distended, but not projecting beyond the free border of the liver. A sound introduced by the duodenum into the ductus choledoctus met a slight obstacle, the cause of which was the presence of a distoma hepaticum, 2·4 centimetres long, and 1·1 in width. The parasite filled without distending the duct. The cystic duct was free, but the hepatic was completely obliterated and changed into a solid cord for the extent of about a demi-centimetre. The two hepatic canals were distended into a number of ampullæ beyond the obliterated point. No other flukes were found in the liver or in the intestine. The author thinks that the hepatic lesions were originally due to the presence of the parasite. In the sheep the distoma produces inflammation of the biliary passages, with subsequent obliteration and distension. In the above case, a microscopic examination showed that the obliteration owed its origin to adhesive inflammation.

IX. *Discovery of the Spores of the Achorion Schönleinii in the Air which surrounds Patients affected with Favus.* By M. Bazin. (Académie des Sciences, July 18; Gazette Médicale de Paris, July 30.)

In order to demonstrate the possibility of favus being propagated through the medium of the air, without mediate or immediate contact or inoculation, M. Bazin has performed the following experiments:—He selected a patient, aged sixteen, who had suffered from favus for seven years, affecting the whole of the hairy scalp, and placed him under such circumstances that a current of air passing over his head was directed against two jars filled with ice, and placed in a basin at a distance of fifty centimetres. By making the patient rub his head and hair, the current of air carried to a distance particles of favus crust, visible to the naked eye, in which the microscope discovered the existence of the achorion. But as the current of air passed over the vessels of ice it deposited its moisture, and this running down the sides of the vessel was collected in the basin below. In the fluid a great number of isolated spores were found. The experiment was repeated several times, and on each occasion thirty or more spores were demonstrated in a single drop of the liquid. The author concludes that the spores may be carried by atmospheric air, and that what was formerly only an hypothesis is now a demonstrated fact.

X. *Notes of Dissections of Colonial Fever.* By P. H. Mac Gillivray, A.M., M.R.C.S.E. (Australian Medical Journal, August, 1864.)

The author publishes reports of the dissections of fatal cases of continued fever, which occurred in the Bendigo Hospital during the past two years. He identifies the "colonial fever," as it is called, with the European typhoïd or enteric fever. The post-mortem appearances are precisely similar, and the symptoms during life differ in no important respect except in the more frequent absence of the eruption of rose-coloured spots in the colonial variety. He relates the particulars of eight post-mortem examinations—seven of Europeans, one of a Chinese. In all the cases ulceration of Peyer's patches was found. In several, the ulceration extended into the cæcum and upper part of the colon. Enlargement and softening of the spleen, and enlargement of the mesenteric glands, were also common appearances.

XI. *On the Waxy or Amyloïd Form of Bright's Disease.* By T. Grainger Stewart, M.D., F.R.C.P., &c. (Edinburgh Med. Journal, Aug. 1864.)

Dr. Stewart's present paper is a continuation of one published in the same journal in February, 1861. The following is the group of symptoms which he believes are associated with waxy or amyloïd disease of the kidney, and he considers them so distinct and constant as to render it easy to distinguish during life between this and other forms of renal affection. "An individual who has long suffered from wasting disease, such as scrofula, caries, necrosis, or syphilis, or who, though without palpable disease, is of a feeble constitution, feels an increasing weakness, and begins to pass large quantities of urine, and to drink largely. He is, contrary to his usual custom, obliged to rise repeatedly during the night to make water, and on each occasion passes a considerable quantity. The amount of urine varies from fifty to upwards of two hundred ounces daily, always bearing a relation to the amount of fluid drunk, generally nearly equalling it in amount, or sometimes even exceeding it. The feet and ankles become œdematous after a hard day's work, but return to their natural condition during the night's repose. In many cases there is observed a hardness and swelling in the hepatic and splenic regions, dependent on an increase of bulk of the liver and spleen. The patient feels a constant lassitude and unfitness for exertion. His urine generally becomes albuminous, and a few waxy or hyaline tube casts are to be found in the very scanty sediment which it throws down. It is of low specific gravity, 1005 to 1015. The blood presents some peculiarities microscopically; the white corpuscles being somewhat increased in number, and the red presenting a flabby appearance, with a marked tendency to tail—that is to say, instead of forming into rouleaux, like healthy corpuscles, they become stretched out into long spindle-shaped bodies. The blood changes, I have observed, only when the degeneration affected the lymphatic or blood glands. The patient may continue in this state for months, or even years—may, indeed, undergo a temporary improvement—the liver and spleen becoming diminished in bulk, and the blood resuming a more healthy character; but, sooner or later, for the most part, ascites or general dropsy gradually supervene, accompanied frequently by diarrhœa, which is at times found quite uncontrollable. The urine, now very albuminous, diminishes in quantity, so as at times to be almost or altogether suppressed; effusions into the serous cavities, or severe bronchitis ensue; the patient becomes exhausted and sinks, or drowsiness comes on, and the disease terminates amid coma and convulsions." After relating a number of cases in which this combination of symptoms was observed, in several of which the diagnosis was confirmed by post-mortem examination, Dr. Stewart proceeds to consider the above symptoms *seriatim.* An *increase in the amount of urine passed* was a constant symptom in all the cases observed, it was marked throughout the course of the disease, a diminution below the natural standard being only noted towards the end of the case or under accidental circumstances. Dr. Stewart is disposed to ascribe the polyuria to change in the small arteries of the cortical portion of the kidney, and not to an increased circulation through, and secretion from, the vasa recta of the medullary portion, the result of an obstruction of the passage of blood through the vessels of the cortical portion. He writes:—"The earliest manifestation of the degeneration is commonly in the transverse muscular fibres of the small arteries; and if these fibres are degenerated, it is reasonable to suppose that they are paralyzed, and so the regulating influence lost, and a congestion of the Malpighian bodies results." He thinks it improbable that the increased amount of secretion can take place from the vessels of the medullary portion, because the amount of blood sent to them in the natural condition is much less than the amount sent to the vessels of the cortical portion. "To say that a set of vessels, not amounting to more than one-fifth of another set, are capable of performing all their functions, seems to me extremely unsound, and, especially in this case, untenable, seeing that the vasa recta of the medullary portion are themselves very often the seat of this degeneration, and yet the polyuria is present." With regard to the *tube casts*, he finds that in the amyloïd degeneration tube casts of various kinds are met with—delicate transparent casts which were formerly called waxy, and are now better termed hyaline,—these hyaline casts, with occasional epithelial cells in a state of fatty degeneration enclosed in their substance—others with a large number of fatty cells, and occasionally finely or coarsely granular casts. It is only when casts contain individual cells in a state of amyloïd degeneration, and presenting its peculiar reaction, that they establish the diagnosis of amyloïd degeneration of the kidney; none of the others afford any special evidence on one side or the other, for they occur in all forms of Bright's disease. Hence the term "waxy casts," which is often applied to the hyaline, and which might be supposed to indicate a peculiar relationship between these casts and waxy degeneration should be abandoned. *Dropsy*, in some instances, never occurs, in the majority of cases it appears as a serious concomitant late in the disease; in other cases earlier. *Diarrhœa* is a common, and frequently a serious symptom. Dr. Stewart's cases tend to confirm Virchow's statement in the 'Cellular Pathologie,' that this symptom in these cases is associated with degeneration of the intestines. In one case the *temperature* was constantly diminished by a few degrees. The peculiar condition of the *blood* before noticed he believes to depend on amyloïd degeneration of the spleen and lymphatic glands. The *duration* of the disease is frequently protracted, some of his cases were under observation for three and four years. The *termination* is usually fatal, but from two cases he has observed he is inclined to think not invariably so. The treatment consists in supplying nutritious diet, tonic and hæmatic medicines, especially the syrup of the iodide of iron, and, where syphilitic cachexia has been the origin of the malady, the iodide of potassium.

XII. *On Lesion of the Aorta and Cardiac Plexus in Angina Pectoris.* By M. LANCEREAUX. (Gazette Médicale de Paris, July 9th, 1864.)

In the case of a man, a patient of M. Rostan's, who died at the Hôtel Dieu during an attack of angina pectoris, the following post-mortem appearances were observed.—Lesion of the aorta: Between the two orifices of the coronary arteries, narrowed to an extent which scarcely admitted the introduction of a stilette, a projecting plate of several centimetres' extent was found; it was festooned at the borders, and composed in great part of newly formed connective tissue. Situated between the internal and middle coats, the new tissue appeared to contain in its substance a finely arborescent structure; the external coat of the aorta, especially in the neighbourhood of its connexion with the pulmonary artery, was the seat of an extremely rich abnormal vascularity. The cardiac plexus which lies on this part of the vessel participated in the vascularity, and some of its filaments were found included in a sort of plasma on the surface of the thickened external coat. Microscopic examination of the nervous filaments and of the ganglia showed that numerous round nuclei were interposed in masses between the tubular elements, compressing them more or less. The medullary portion of the tubules was greyish and granular. A calcareous tubercle, the remains, no doubt, of a cretaceous lymphatic gland, was found close to the point of recurrence of the left inferior laryngeal nerve, where it adhered to the neurolemma. The aortic valves were slightly thickened near their adherent border; otherwise the heart and the other organs were healthy, with the exception of the liver, which was slightly fatty. M. Lancereaux states that he has observed in two cases of sudden death a similar aortic lesion —having the same seat, the same characters, and giving rise to a notable narrowing of the coronary arteries. This fact leads him to suppose that in some cases at least a cause of angina pectoris may be some alteration of the cardiac plexus; for although in the last-named cases the cardiac plexus was not examined, the lesion of the aorta in the immediate neighbourhood would not probably leave the cardiac plexus intact. In another instance, that of a patient who with an apparently slight cardiac affection, suffered at times from violent attacks of dyspnœa, the author met with a very analogous aortic lesion. It cannot be denied, in presence of the experimental results furnished by galvanization of the pneumo-gastric, that an alteration of the cardiac plexus may account for the symptoms and termination of attacks of angina pectoris. The author adds, that he has twice met with the lesion in association with the rheumatic diathesis, once in a patient who had accustomed himself to the abuse of tobacco, and once in an absinthe drinker.

XIII. *On an Organic Lesion of the Nervous Centres, peculiar to the General Paralysis of the Insane.* By M. Joire. (Bulletin Médical du Nord; and Gazette Médicale de Paris. August 27th, 1864.)

M. Joire states that for three years he has constantly found in the brains of the insane, who have been the subjects of general paralysis, an alteration of the anterior and inferior surface of the fourth ventricle. The lesion consists in the development of a considerable number of granulations, resembling in appearance the elevations produced on the skin under the influence of cold. This appearance exists in different degrees according to the date of the affection. In subjects who have succumbed at an early period of the disease, the granulations are numerous, very small, and their appearance gives the idea of a surface strewn with grains of sand. In old cases the points are voluminous, whitened, or transparent, and of a consistence sufficiently firm to furnish a rough sensation to the touch. It is especially in the inferior part of the floor of the fourth ventricle, at the level of the "V" of grey matter formed by the separation of the restiform bodies, that the development of these granulations is most remarkable. In connexion with this lesion there is frequently more or less fluid found in the ventricles and in the meninges, and it is sometimes accompanied by a softening of the superficial layer of cerebral substance, which is its seat. This layer appears gelatinous or semi-transparent, and is easily raised by gently rubbing it with the back of the scalpel. The author has noticed in five or six cases the existence of the same lesion in the parts forming the floors of the lateral ventricles.

XIV. *On the Condition of the Kidney in the Gouty.* By MM. CHARCOT et V. CORNIL. (Gazette Médicale de Paris, June 4th and 11th, 1864.)

Two forms of lesion of the kidney are found in gouty subjects. The first, although dependent on gout, does not present any feature distinctive of it, whilst the other especially belongs to it. In the first category the lesions are simply those of albuminous nephritis; the second comprises deposits of uric acid or of urate of soda in the kidney. These renal deposits present two defined forms accordingly as they are formed of uric acid or urates. In well-marked cases, the urates deposited in the kidney in white lines are as characteristic of the disease as are the concretions of the same kind in the articulations. The authors, whilst they allow the frequency of the occurrence of the small, hard, atrophied kidney, in which the cortical substance is diminished—first described by Todd as "the gouty kidney"—in the gouty, deny that it is peculiar to the disease. They say that the same condition of the organ may be found in other diseases besides gout; and on the other hand they assert, on the evidence of cases observed by Garrod and by themselves, that the kidneys of the gouty may present anatomically all the lesions of Bright's disease (albuminous, desquamative, or parenchymatous nephritis). They give Garrod the credit of having first accurately described the special form of deposits of urate of soda in the kidneys. These appear as linear white deposits, following the direction of the tubules of the pyramids; the deposit shows a crystalline structure consisting of prisms of urate of soda. Their composition is always the same, as shown by the production of murexide on the addition of nitric acid and ammonia, and by the crystallization of uric acid on the addition of an acid. The question, whether the deposit of the urate of soda is situated within or outside the uriniferous tubules, is an open one. Garrod's first observation led him to think that the white lines were due to a filling of the uriniferous tubules; and this also was Mr. Ceeley's conclusion, in a case communicated by him. Subsequent observations, however, led Dr. Garrod to modify his opinion. The crystals of urate of soda, commonly larger in the kidney than in the cartilages, seemed frequently to be situated in the cellular tissue rather than in the cavities of the tubuli. In a case observed by the authors, at first sight the crystals seemed placed in the intervals between the tubuli; but by adding acetic acid and dissolving the free crystals, it became clear that a part of the deposit was seated in the interior of the uriniferous tubules. The following are the author's conclusions:—

1. That in a certain number of the gouty, in consequence of the irritation produced in the kidneys by the passage of a large quantity of urates, albumen appears in the urine, irregularly and in small quantity; and this condition is sometimes accompanied by œdema.

2. That these symptoms correspond with an anatomical alteration of the kidneys, which consists in a chronic form of albuminous nephritis (parenchymatous nephritis), or in a chronic alteration, characterized by atrophy of the parenchyma, with thickening of the fibrous partitions and of the arterial coats (interstitial nephritis, *gouty kidney* of Todd,) but that these lesions have nothing which pertains specially to gout.

3. That two forms of deposit in the kidney belong properly to gout—1. Deposits of uric acid (yellow or red granules), the *néphrite goutteuse* of M. Royer; 2. Deposits of urates, which are characteristic of gout, and completely identical with those of the articulations.

XV. *Spotted Fever and Cerebro-Spinal Meningitis.* (The American Journal of Medical Sciences, July, 1864.)

This fever, of which several notices have appeared in former reports, is still attracting attention in Philadelphia. It will be remembered that it is a disease of an eruptive form and asthenic type, in many instances defying treatment, and running its course to a fatal termination in from a few hours to two or five days. In many of the cases now recorded, tetanic spasm of the muscles of the back and neck, producing bending back of the head, was a prominent symptom. Other forms of convulsion and marked exaltation of the sensibility of the skin have been frequently observed. In most of the cases petechiæ are present, although their occurrence is not invariable. In some of the cases nothing more than congestion and ecchymosis has been discovered in the membranes of the brain; but in a case related by Dr. R. T. Edes, which terminated fatally on the fifth day, the surface of the brain was covered with a layer of greenish matter, purulent in appearance, but of almost cheesy consistency. This exudation was found to consist of cells like pus-cells, but with more peculiar contents and less distinct nuclei, and of fibres. In a case related by Dr. Jewell, besides congestion of the dura mater there was yellow serous effusion in the subarachnoïd space and in the spinal canal also. The lateral ventricles also contained a somewhat abundant reddish serum. Dr. H. Hartshorne has called the attention of the Philadelphia College of Physicians to certain points of similarity between the American "spotted fever" and a disease which has occurred epidemically at several times and places in Europe, an account of which is given by Boudin in his 'Traité de Géographie et de Statistique Médicales et des Maladies Endemiques.' This, the méningite cérébro-spinale épidémique of some French authors, was by the Germans called "cerebral typhus," and by the Italians "tifo apoplettico tetanico." This disease was first clearly defined at Geneva in 1805, and exhibited the following characters: Sudden attack in the night, vomiting of green matter, atrocious cephalalgia, spinal rigidity, difficulty of deglutition, convulsions, nocturnal exacerbations, petechiæ, death occurring after from twelve hours to five days' illness. An epidemic is described at Grenoble in 1814, in which tetanus accompanied one variety of the fever, whilst in another variety it was not observed. In an epidemic in the department of Landes in 1837, exaltation of the tegumentary sensibility was remarked in certain cases. As in America, the fever has generally made its appearance under military *régime*—in a regiment or garrison town, or sometimes among galley slaves. In the European epidemics, although in some cases no appreciable lesion was discovered after death, in others serous inflammations, especially cerebro-spinal, proceeding in a few cases to the formation of pus, were noticed.

XVI. *Summary.*

The following papers and memoirs are cited by title only, as want of space prevents a more extended notice of them:

Cancer of the Stomach. By W. S. W. Ruschenberger, M.D., Surgeon United States Navy. (American Journal of Medical Sciences, July, 1864.)

On Heart Disease in the Army. By Dr. H. Hartshorne. ('Transactions of the College of Physicians of Philadelphia.' American Journal of Medical Science, July, 1864.)

Remarks on the Diagnosis of Abdominal Swellings, in relation chiefly to Dilatation of the Colon. By Henry Kennedy, A.B., M.B. (Dublin Quarterly Journal of Medical Science, August, 1864.)

Contagion Viewed Practically. By D. C. Connor, A.B., M.B. (Dublin Quarterly Journal of Medical Science, August, 1864.)

Remarks on the Hebrew Catalogue of Skin Diseases. By T. W. Belcher, M.A., M.D. (Dublin Quarterly Journal of Medical Science, Nov., 1864.)

Progressive Motor Ataxy. By L. W. Salomonsen. Translated by W. D. Moore, M.D. (Dublin Quarterly Journal of Medical Science, Nov., 1864.)

Cases of Delirium Tremens treated with Large Doses of the Tincture of Digitalis. By J. W. Reid, M.D., Surgeon R.N. (Edinburgh Medical Journal, August, 1864.)

On the Treatment of Albuminuria in Children. By W. H. Dickinson, M.D. (Edinburgh Medical Journal, September, 1864.)

Alopecia Areata treated by Carbolic Acid. By James Watson, M.D. (Edinburgh Monthly Journal, September, 1864.)

On Insufflation as a Remedy in Intus-susception. By David Greig, M.D. (Edinburgh Medical Journal, October, 1864.)

Degeneration and Atrophy of the Cerebrum causing Unilateral Epilepsy. By K. McLeod, M.D. (Edinburgh Medical Journal, 1864.)

Observations on Scrofula on the North-east Coast of Scotland. By D. Carmichael, M.D. (Edinburgh Medical Journal, November, 1864.)

Observations tending to prove a Constant Coincidence between Derangements of Speech and a Lesion of the Left Hemisphere of the Brain. By M. Dax, Académie Impériale de Médecine. (L'Union Méd., December, 1864.)

Perforation of the Ductus Choledochus by a Biliary Calculus, &c. By Dr. E. Guibout. (L'Union Médicale, September 27th, 1864.)

Ascarides Lumbricoides having penetrated into the Liver during Life. By Dr. G. Bargioni. (L'Union Médicale, November 22nd, 1864.)

On Uræmic Fever treated for Typhoïd Fever. By Dr. H. Mussy. (L'Union Médicale, September 20th, 1864.)

On Uræmic Fever. By M. N. Barthe. (L'Union Méd., Nov. 15th, 1864.)

Discussion on Malignant Pustule. (Gazette Médicale de Paris, July and August, 1864.)

Upon certain Pathologico-Anatomical Proportions of the Heart. By Prof. Joseph Engel. (Schmidt's Jahrb., vol. cxxiii. p. 294. From Wien. Med. Wochenschr., Nos. 13 and 14. 1864.)

Report on Military Medicine and Surgery. By Dr. O. Martini, Dresden. (Schmidt's Jahrb., vol. cxxiv. pp. 81–135 and pp. 241–259.

Résumé of recent Observations on Tape Worms and Cystic Entozoa. By H. Meissner. (Schmidt's Jahrb., vol. cxxiv. p. 29.)

QUARTERLY REPORT ON SURGERY.

By John Chatto, Esq., M.R.C.S.E.

I. *On Encysted Tumours in Children.* By M. Guersant. (Bull. de Thérapeutique, June 15th.)

Encysted tumours are often met with on the face and scalp, and especially the eyelids; and although they may sometimes disappear under the influence of an inflammatory elimination or the action of solvents, when they prove persistent and increase in size they should be removed. In dread of erysipelas, M. Guersant has renounced in these cases the employment of cutting instruments, and resorts in all of them, even in tumours of the eyelids (except when these can be extracted on the inner side), to the Vienna paste. Through the aperture formed by its aid the tumours will sometimes issue unaided, although, on other occasions, its elimination may have to be assisted. The cicatrix left behind is smooth and does not project, but it is of slower formation than is that which succeeds to incision. No accidents follow the separation of the tumour, especially when its extrusion has taken place unaided. Sometimes, when this process has been sought to be hastened, erysipelas has occurred. The tumour to be acted upon is covered with adhesive plaster, in which an aperture has been cut of the form and size of the intended opening in the skin, and over this the paste is spread. In eight or ten minutes an eschar is produced, which may be poulticed or otherwise treated, so as to facilitate its separation. This may be delayed for eight or ten days; and after it has taken place, and the tumour has issued out, whether spontaneously or aided by nitrate of silver, cicatrization should be encouraged. With respect to small cysts of the eyelids, M. Guersant follows Dupuytren's procedure of opening and emptying them, and then cauterizing their internal surfaces.

Cysts of the neck, forming quite another description of tumour, are often met with in children. They are almost always indolent, and as transparent as hydrocele, and unless this be borne in mind they may be easily mistaken for "cold abscess." M. Guersant's usual practice in these cases is to inject either wine or diluted iodine, as in hydrocele, and the result has in general proved satisfactory. When the cyst is multilocular, a filiform seton left in for several days may prove useful, by exciting inflammation in the various cells it traverses. As this sometimes gives rise to erysipelas, it may be preferable to puncture the different cysts with platinum needles heated to whiteness. One or two ordinary punctures should first be made, to ascertain the reality of the multilocular condition.

Cysts in front of the patella are sometimes met with in children, and may be treated by iodine injections, or, as in one of M. Guersant's cases, by a filiform seton. The inflammation induced by this is only moderate, and it may be rendered so, when otherwise, by the use of elastic collodion. The synovial cysts or ganglions, which become developed in the course of tendons, may be treated in three ways with success. They may be burst, and subjected to pressure for some days. When this cannot be executed, or there has been a relapse, the cyst should be pierced by a fine lanceolated needle, so as to discharge the fluid, compression being afterwards applied. If both these means fail, a small filiform suture should be passed through the cyst, covering the parts with elastic collodion after the discharge of the fluid, in order to prevent erysipelas. After moving the seton next day, a new layer of collodion and a bandage should be applied, the seton only being finally withdrawn after all fluid has ceased to flow.

II. *On a Syphilitic Affection of the Mammary Gland.* By Dr. Ambrosoli. (Gazetta Medica Lombardia, No. 36.)

A year or two since Dr. Ambrosoli had his attention drawn by a man suffering from secondary syphilis to the condition of both his mammary glands, each of which had become the seat of a small, indolent, somewhat indurated tumour, which was slowly increasing in size, involving, in fact, the whole gland, and was attended with nocturnal pains. The axillary glands were not enlarged. The author, suspecting the syphilitic character of the swelling, prescribed iodide of potassium, and under its influence the tumefaction gradually subsided in the course of six weeks, as did all remaining signs of syphilis. Subsequently Dr. Ambrosoli has met with two other cases, in women, in each of which one of the breasts underwent uniform enlargement, which was reduced also by the iodide. He thinks that these three cases entitle him to call the attention of the profession to the subject; and, awaiting further investigation, he furnishes the following definition of the affection: "A total hypertrophy, more or less considerable, of the mammary gland, together with uniform induration of its tissue, which manifests itself in the subjects of syphilis of either sex towards the decline of secondary symptoms, associated sometimes with tertiary symptoms, and terminating in recovery when suitably treated." He considers that this affection presents many analogies with syphilitic orchitis.

III. *On the Reduction of a Dislocated Cervical Vertebra.* By M. Maisonneuve. (Comptes Rendus de l'Académie des Sciences, June 27th.)

M. Maisonneuve observes, that cases of spontaneous dislocation of the first cervical vertebræ are by no means rare, and in a few instances the cure of so serious a lesion has been obtained after the gradual compression of the spinal marrow had given rise to partial paralysis. But when a sudden displacement has given rise to general paralysis of the limbs and trunk, the affection has always seemed irremediable, the boldest surgeons not daring to try to effect reduction lest the patient might die under their hands. M. Maisonneuve has, however, ventured upon this procedure, and the result has been most satisfactory.

A girl, aged sixteen, had been for some months past the subject of a white swelling of the atloido-axoidean articulation, causing tumefaction of the sub-occipital region, bending of the head forwards, and slight numbness of the upper extremities, when a sudden movement of the head gave rise to a dislocation of the two first vertebræ, with consequent paralysis of the trunk and limbs, the diaphragm still continuing to maintain the respiratory movements. The patient being evidently on the point of death, M. Maisonneuve resolved to attempt reduction; and placing one hand under the chin and the other under the occiput, he practised gentle and continuous traction, while two assistants supported the shoulders and trunk. In the course of about half a minute a slight, but very distinct, rubbing sound was heard, and the head was at once restored to its normal position. Sensibility and even motion began to reappear in the paralysed parts, and by the end of a week had regained their normal character. At the date of the report, three months after the occurrence of the dislocation, the patient might be regarded as quite cured.

IV. *On Hydrocele of the Hernial Sac.* By M. Velpeau. (Gaz. des Hôp., No. 82.)

A tailor, aged twenty-four, entered one of M. Velpeau's wards with a tumour on the left side of the scrotum. As large as the double fist, and situated below the external ring, it was soft, indolent, tense, fluctuating and irreducible. There was neither impulse on coughing nor transparency. It was prolonged by a pedicle, the size of the thumb, into the inguinal canal. The skin over the tumour was normal in appearance, and the testis was distinctly felt at the bottom of the scrotum. The man had worn a truss for several years for a hernia, which had never been completely reduced, a small swelling always remaining. Ten days prior to admission the truss had been broken, the tumour somewhat rapidly increasing in size, but without pain or inflammation. A portion of the hernia only could be returned, and the man came to the hospital. M. Velpeau, much influenced by the free fluctuation present, came to the conclusion that this was an example of an old intestinal-omental hernia, in which the gut had been returned, leaving only omentum—an effusion of fluid having also taken place into the sac. Six days after admission the sac was punctured, and a reddish but perfectly limpid fluid having been discharged, the presence of omentum was ascertained. An iodine injection was then thrown in, and next day a pretty smart attack of inflammation occurred, accompanied by febrile action. This soon abated, and the patient went on very well, so that when he was discharged, three weeks after his admission, one side of the scrotum was scarcely larger than the other.

It was M. Velpeau who first conceived the idea of treating this form of hydrocele in the same way as hydrocele of the tunica vaginalis; of course, in such a case inflammatory action is more to be dreaded, owing to the intercommunication with the peritoneum; but M. Velpeau having found that iodine injections never give rise to purulent inflammation in closed cavities, determined to employ them in congenital hydrocele, taking care to compress the inguinal canal against the pubis. In the numerous cases of this kind in which he has employed these injections, he has never met with any accident, and he therefore naturally felt no hesitation in extending the practice to hydrocele of the hernial sac, in which, the canal being plugged with omentum, the penetration of the iodine into the peritoneal cavity could scarcely occur. By this operation, also, conjoined with careful adjustment of a truss, the radical cure of the hernia may in some cases be effected.

V. *On Iridectomy in Glaucoma.* By Professor QUAGLINO. (Annali di Méd., October.)

Professor Quaglino, of Pavia, at the end of an excellent account of our present knowledge concerning glaucoma, expresses the following opinions upon its curative treatment by iridectomy: 1. Glaucoma, arthritic amaurosis, and arthritic ophthalmia of the older ophthalmologists, are dependent upon one and the same identical morbid process, which only varies by the length or acuteness of its course. 2. The pathological condition which induces chronic and acute glaucoma is choroïditis, with increased secretion of the vitreous humour, and consequent distension of the retina and papilla of the optic nerve, associated with an extraordinary rigidity and hardness of the sclerotica, proper to the senile condition, or induced by an atheromatous and arthritic process at a less advanced age. 3. In acute glaucoma not only is the choroïd implicated by the morbid process, but this also extends to the retina, the hyaloïd, and the internal membranes, while in chronic glaucoma the choroïd is alone in question. 4. The functional phenomena which precede and accompany the development and course of glaucomatous amaurosis, are a consequence of the compression which the nervous elements of the retina and the optic nerve undergo, and of their progressive atrophic degeneration. 5. The most prompt and certain means which art possesses for arresting the progress of this disease, and restoring the equilibrium in the pressure of the vitreous humour and the lateral pressure of the vessels of the retina, is iridectomy, the excision of an extensive portion of the iris. 6. Iridectomy may be resorted to with advantage even in cases in which there are evident physical signs of atrophy of the papillæ with excavation, lateral limitation of the field of vision or amblyopia, providing there exists extraordinary hardness of the globe of the eye. In such cases iridectomy at least removes one of the morbid elements (internal pressure) which favours atrophy of the papillæ, and thus frequently arrests the amaurosis. 7. Iridectomy possesses no advantage in very inveterate glaucoma, when the papilla and the vessels have been for a long time atrophied; in cases in which an optic neuritis inducing atrophy of the papillæ has preceded the glaucoma, or when glaucoma is complicated with serious affections of the cerebral optic centres. 8. Iridectomy is of service in cases of obstinate ciliary neuralgia, even when amaurosis has become complete, providing that it depends solely upon compression of the ciliary nerves.

VI. *On Extraction of Foreign Bodies from the Ear and Nose.* By Professor GROSS. (American Journal of Medical Science, October.)

Mr. Gross, after alluding to the inefficiency of the means for removing foreign bodies from the ear recommended by Wilde and Toynbee, and to the utter impracticability of those suggested by Troeltsch, describes and figures a small instrument which he has employed for years with success, and which, incapable of doing harm to the meatus, can scarcely fail in its object even in the hands of the inexperienced. This instrument consists of a delicate light cylindrical bar of steel, five and a half inches long, somewhat roughened at its middle to afford a good hold, spoon-shaped at one extremity, and having at the other a very small tooth or prong, projecting at a right angle from the shank. The spoon is also very delicate, and is more bent than the ordinary cataract curvette. The patient is placed in an easy recumbent posture, with the head slightly raised on a pillow, the full administration of chloroform being also quite necessary when the subject is a child or a nervous, excitable adult. "I carefully pass the narrow extremity of the pick sidewise between the intruder and the meatus, and bringing the little prong behind it, I readily jerk it out, no matter how deep it may be buried, by a kind of lever movement with the handle of the instrument. The operation is generally the work of a few seconds, and is altogether free from hæmorrhage. No possible injury can be inflicted upon the meatus, much less upon the membrana tympani, if proper caution is used. When the substance is very small, the object is sometimes most readily attained by the use of the curvette; but in general the prong is altogether preferable, whatever may be the size or consistency of the body, whether round or angular, hard or soft, small or large. A pebble, grain of coffee, bug, or pellet of paper, wool or cotton, may all be equally easily extracted. Ear-wax, however hard, or however firmly impacted, is more easily removed with such an instrument than with any other contrivance of which I have a knowledge." In all cases certain rules must be observed: 1. The surgeon must completely satisfy himself by a careful inspection that there really is a foreign body in the ear, and that the patient is not suffering from a false alarm. 2. No attempt at extraction should be made until any swelling or inflammation caused by previous attempts has been completely subdued. 3. When the body is concealed by blood, pus, or ceramen, this must first be removed by syringing with tepid water. 4. The after-treatment, when any is required, should be strictly antiphlogistic.

The extraction of foreign bodies from the nose, as usually attempted, is attended with unnecessary difficulty and violence, the effect often being only to force the body further in. Properly conducted, it is one of the easiest of operations. "My practice in these cases is simply this. In the first place, the child must be properly secured. If he is very strong and rebellious, he should be wrapped up in a sheet or apron, to prevent him from using his hands and feet. Chloroform is seldom necessary. The head, inclined slightly backward, should be immovably fixed by an assistant, while another holds the patient on his lap. The small extremity of the 'ear-pick' is then carried flatwise upwards into the nose, in the direction of the bridge, until it is fairly beyond the foreign body, when, the point being depressed, the little hook or tooth is at once brought into contact with it, and extrusion is effected by a kind of jerking or wriggling movement of the thumb and fingers. The operation is generally over in a few seconds. Trouble can only arise when the substance, in consequence of previous abortive efforts, has been pushed back in the nose, or when, as occasionally happens, the nostril is filled with blood. I have myself never encountered the slightest difficulty with the instrument in question, and believe that failure in any case is impossible, if it is judiciously used. Practitioners generally do not seem to be aware that foreign substances in the nose are commonly situated very superficially. In most cases they occupy the entrance of the nostril, resting against the anterior extremity of the inferior turbinated bone, or between this bone and the septum. It is seldom that they are pushed by the child into either of the chambers of the nose, even when they are of small size. If rude and protracted attempts have been made at extraction, the probability is that the body will be found upon the floor of the nostril, or firmly wedged in between the turbinated bone and the septum. In such an event, the operation will be more difficult, but still perfectly feasible."

SUMMARY.

Amputation.—Mader on Gritti's Mode of Amputation. (Wiener Wochenschrift, Nos. 43, 44. Mader believes that this—which consists in sawing off the cartilaginous surfaces of the condyles of the femur and of the patella, and procuring bony union between them—has not received sufficient attention. He relates a case which, however, terminated fatally, and in which there was necrosis of the sawn surfaces.)

Aneurism.—Vanzetti, Seven Cases of Aneurism treated by Digital Compression. (Gaz. des. Hôp., No. 118.)

Anus.—Warren on Imperforate Anus. (Boston Journal, July 14. Relates three cases upon which he operated, in two with success. He dissected the tissue intervening between the integument and the cul-de-sac, and having drawn down and punctured the bowel, secured it by sutures to the margin of the divided integument.)

Bronchocele.—Bresson, Epidemic of Acute Thyroïditis. (Rev. de Méd. Mil., Aug. This occurred in a battalion quartered at St. Etienne, sixteen out of nineteen lads being attacked. Bresson attributes much influence to the stiff military collar worn, but the boys had got into an impoverished state of health, and were kept too long in school.)

Burns.—Guersant, Treatment of Burns in Children. (Bull. de Thérapeutique, vol. lxvii. No. 5.)

Cæsarean Section.—Martin on the Healing Process after Cæsarean Section. (Monatschrift für Geburtskunde, Aug. Martin describes the condition of the cicatrix observed several years after the operation.)

Cataract.—Von Graefe on Opening the Capsule as a Preliminary to Extraction. (Archiv für Ophthalm., vol. x. No. 1.)—Critchett on Extraction by Means of the Scoop. (Annales d'Oculistique, Sept.)—Homberger on the Standard Operations for Cataract. (American Journal of Ophthalmology, April.)

Catheterism.—Dittel, Apparatus for Fixing the Catheter in the Bladder. (Wien Allg. Zeit., No. 42. With an illustration.)

Cleft Palate.—Passavant on Cleft Palate. (Langenbeck's Archiv, vol. vi. No. 2. Passavant describes an operation which he terms "staphylopharyngorrhaphie," for the relief of the nasal intonation in congenital cleft of the hard and soft palate.)

Dislocation.—Pravaz on the Curability of Congenital Dislocation of the Femur: with a Report by Bouvier. (Gazette Hebdom., Nos. 41 and 43.)—Roser, Mechanism of Spontaneous Dislocations. (Arch. der Heilkunde, No. 6.)—Symes, Unusual Form of Dislocation of the Hip. (Dublin Journal, Nov.)—Paris, Case of Irreducible Costo-clavicular Dislocation of the Humerus. (Union Méd., No. 132.)—Reeb, Case of Irreducible Dislocation of the Carpus

Forwards. Recueil de Méd. Militaire, Aug. With illustrations.)—Fargues, Case of Dislocation of the Wrist. (Ibid. With illustrations.)

Ear.—Brenner on Galvanism in Nervous Noises of the Ear. (Petersburgh Med. Zeit., No. 8.)—Triquet, Statistics of Diseases of the Ear. (Gaz. des Hôp., No. 137. These relate to 895 cases treated by Triquet at his Clinic during 1860–64.)—Voltolini, Postmortem Appearances in the Ear of the Deaf and Deaf and Dumb. (Virchow's Archiv, vol. xxxi. No. 2. This is the fourth series of autopsies, consisting of 19 cases. Voltolini dwells much upon the importance of making a more exact examination of the labyrinth.)—Gruber, Cases of Necrosis of the Petrous Bone. (Wien Allg. Zeit., Nos. 41, 43, 45. An extraordinary and unique case given, in which the cochlea, with a portion of the wall of the tympanum, were discharged from the meatus of each ear, the boy recovering.)—Kramer, Criticism on Politzer's Mode of Removing Obstruction of the Eustachian Tube. (Deutsche Klinik, No. 34.)—Siegle, Pneumatic Ear-speculum. (Ibid., No. 37. A new instrument for determining with exactitude the amount of mobility remaining in the membrana tympani.

Encephalocele.—Szymanowski, Two Cases of Encephalocele. (Langenbeck's Archiv, vol. vi. No. 2.)

Entropium.—Von Graefe on the Operation for Entropium and Ectropium. (Archiv für Ophthalmologie, vol. x. No. 1.)

Fracture.—Tyson, Treatment of Fracture of Femur by Extension, effected by Weights. (American Journ. Med. Science, October.)—Ciniselli, New Apparatus for Fracture of the Femur in Children. (Annali Universali, July.)

Galvano-caustic.—Grünewaldt on Galvano-caustic Operations. (Petersburgh Med. Zeit., No. 7. Grünewaldt furnishes an account of many cases of these operations performed on women.)

Genital Organs.—Szymanowski on Congenital Defects of the Genital Organs in Childless Persons. (Prag. Vièrtel, No. 3. Szymanowski relates several cases in which operations were performed for these defects, which, he says, are found to occur with remarkable frequency among the Hebrew population of South-west Russia.)

Gonorrhœa.—Zeissl on Gonorrhœal Rheumatism. (Wien Allg. Zeit., Nos. 39, 40.)

Hare-lip.—Guersant on the Operation for Hare-lip. (Bull. de Thérapeutique, Nov. 15.)

Hemeralopia.—Quaglino on Pathology of Hemeralopia. (Gazetta Medica Lombardia, No. 42.);

Hip-joint Disease.—Gaillard on an Improved Mode of Treating Hip-joint Disease. (Gazette Médicale, No. 47.)

Iridectomy.—Discussion on Iridectomy at the Paris Surgical Society. (Gaz. des Hôp., Nos. 106, 109, 115.)

Jaw.—Duplay on Closure of the Jaws. (Archives Gén., October. Criticism on Esmarch and Rizzoli's Operations.)

Joints.—Kade, Indications for the Conservative and Operative Treatment of Injuries of the Joints. (Petersburgh Med. Zeit., No. 7.)—Guersant, Chronic Arthritis in Children. (Bull. de Thérap., Aug. 15.)

Laryngoscope.—Türck, New Form of Laryngeal Forceps. (Wien. Allg. Zeit., No. 44.)

Leprosy.—Poncet, Leprosy in Mexico. (Recueil de Méd. Mil., October. Poncet gives an interesting account of leprosy observed in natives since the

French occupation, with cases and illustrations. He describes three forms—elephantiasis of the Greeks, anæsthetic leprosy, and spotted leprosy.)

Lithotrity.—Maisonneuve on the "*Lithexerie.*" (Gaz. des Hôp., Nos. 131–135. Maisonneuve so designates a kind of screw acting upon the Archimedean principle, by the aid of which he states that fragments may be rapidly extracted from the bladder, and the number of *séances* in lithotrity operations greatly diminished.)

Military Surgery.—Schiller, Four Weeks in Schleswig Holstein. (Würzburg Zeitschrift, No. 2. Account of the arrangements for the care and treatment of the wounded in the Schleswig-Holstein War.)—Neudörfer, Report on the Wounded in Schleswig. (Langenbeck's Archiv, vol. vi. No. 2.)—Martini, Report on Recent Progress of Military Surgery. (Schmidt's Jahrb., Nos. 10 and 11.)

Ovariotomy.—Kimball, Nine Cases of Ovariotomy. (Boston Journal, June and Sept.)—Schuh, Case of Ovariotomy. (Wien Wochenschrift, Nos. 36, 37. Terminated fatally, from internal strangulation of the ileum.)—Keith, Case of Ovariotomy. (Edinb. Journal, Dec.)—Clay, 109th and 110th Cases (75th and 76th successful) of Ovariotomy. (Glasgow Journal, Oct.)

Skull.—Friedberg, Rare Case of Injury to the Skull. (Virchow's Archiv, vol. xxx., No. 5. Paralysis of the levator palpebræ twenty-seven weeks after successful trephining, and orbital abscess from undetected fracture of the orbital plate.)

Spine.—Lidell on Injuries of the Spine. (Amer. Journ. of Med. Sciences, Oct.)

Stomach.—Henrici, Wounds of the Stomach. (Deutsche Klinik, Nos. 30–40. A *résumé* of the present state of knowledge on this subject, but no new facts.)

Stricture.—Boeltcher, New Form of Catheter for Impermeable Stricture. (Annalen des Charité Krank, vol. xii. No. 1.)

Sutures.—Passavant on Sutures. (Langenbeck's Archiv, vol. vi. No. 2. Passavant's paper is chiefly occupied in setting forth the value of silkworm gut as a material for sutures, having found them of equal utility with metallic sutures, and much cheaper.)

Syphilization.—Simpson, Syphilization in Constitutional Syphilis. (Edinb. Journal, December.)

Wounds.—Billroth, Traumatic Fever and Accidental Complications of Wounds. (Langenbeck's Archiv, vol. vi. No. 2. A second series of his valuable observations upon these subjects.)—Chedevergne, Alcohol as a Dressing for Wounds. (Bull. de Thérapeutique, vol. lxvii. Nos. 6, 7, 8. An account is here given of the results of alcoholic dressing employed by M. Nélaton at the Hôpital des Cliniques. These were highly favourable, pyæmia, erysipelas, &c. being now hardly met with in this hospital.)

QUARTERLY REPORT ON MIDWIFERY.

By Robert Barnes, M.D.,

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I. The Non-pregnant State.

Congenital Atresia of the Left Half of the Vagina with Double Uterus. Retention of the Menstrual Fluid in the Closed Half, and Contemporaneous Metrorrhagia of the Open Half. By Dr. G. Simon. (Monatsschr. f. Geburtsk, October, 1864.)

Dr. G. Simon's case is very remarkable. A girl, aged fifteen, had menstruated at fourteen. From that time menstruation had ceased, and a swelling formed at the external genitals; pains came in abdomen and pelvis, and increased at the menstrual epochs. Eight weeks after the formation of the swelling, suddenly profuse hæmorrhage appeared, and the patient's state was improved; the swelling disappeared. It returned, and there were repeated hæmorrhages. The swelling became fluctuating, and impeded walking. It extended up the vagina, increasing in the fundus. An os uteri was found in the extreme fundus vaginæ. An opening was made in the tumour; blood escaped for several days. The patient recovered well. Menstruation was normally established. A finger could be passed through the seat of the incision into the left vagina, which at the upper part was not closed.

II. Pregnancy.

On the Changes of Position of the Fœtus during Gestation. By Dr. Heyerdahl, of Bergen, in Sweden. (Monatsschr. für Geb., June, 1864.)

Dr. Heyerdahl refers to the researches of Dr. Gassner, who showed that the fœtus frequently made a part-revolution on its long axis during gestation. Dr. Heyerdahl has made independent observations in the Lying-in Hospital of Bergen, in Sweden. Dr. Gassner affirmed, that in 154 cases closely examined, this change of position took place in 22, or in the proportion of 1·7. Dr. Faye, of Christiania, had in 1855, 1856, and 1857, previously observed this rotation of the fœtus on its long axis. These observations showed that in about three-fourths of the pregnant women in whom the fœtal heart was most distinctly heard below, and to the left of the navel, the child was born in the first cranial position, whilst in those in whom the heart was heard below and to the right of the navel, only one-third of the children were born in the second cranial position.

Dr. Heyerdahl relates the following experiment: A woman, who was at the end of the eighth month, in whom the child was ascertained to lie with its back to the right, when the heart-sounds were most distinctly heard, it succeeded by external manipulation, and by lying on the side, to turn the fœtus, so that its back came to the left side, where then the heart-sounds were heard. This experiment proves the possibility of the rotation on the long axis. This is also proved by the fact, that in women who frequently present themselves for examination, the heart-sounds which, at the first examination, were heard to the left, are at a later period heard to the right, and *vice-versâ.* As causes of this rotation, Dr. Heyerdahl assigns movements of the fœtus, contractions of the uterus, the position of the woman, a favourable condition being relative excess of liquor amnii. (Perhaps a more effectual one is the direct pressure upon the uterus exerted during sexual intercourse.) He believes this rotation takes place with more difficulty as the woman approaches the term of pregnancy; and when labour has commenced, the descent of the head and the projecting promontory tend to fix the position.

Dr. Heyerdahl makes the following observation:—When examining pregnant women, he has not seldom found that as soon as the woman has lain down upon her back for the purpose of external examination, the uterus has become hard, so that the child could only be indistinctly felt; on waiting awhile, the uterus becomes relaxed, and the fœtal parts can be distinctly made out. If now the woman stand up, the uterus again feels hard. It hence appears that certain positions of the woman have an influence upon the tone of the uterus, and that in the standing posture the uterus takes on a slight contractile condition.

III. Labour.

1. *On Habitual Abortion with Flexion of the Uterus.* By Dr. V. Hüter. (Monatsschr. f. Geb., Sept. 1864.)
2. *On Eclampsia.* By C. Hecker. (Monatsschr. f. Geb., Oct. 1864.)
3. *On a Case of Twin-Labour Protracted during Three Days.* By Dr. Abarbanell. (Monatsschr. f. Geb., Oct. 1864.)
4. *Report on the Obstetric Policlinique of Professor Hecker at Munich.* By Dr. J. Poppel. (Monatsschr. f. Geb., July, August, 1864.)
5. *On the Healing of the Wound after the Cæsarian Section, with the Description of a Scar resulting from an Operation performed several Years previously.* By Ed. Martin. (Monatsschr. f. Geb., Aug. 1864.)

1. Dr. V. Hüter insists that a frequent cause of abortion is flexion of the uterus. He relates with much detail cases of which the following is a summary—

Case 1.—First and second abortion in the tenth week of pregnancy, third abortion in the seventh, fourth abortion in the tenth week. No ascertainable cause of the four abortions. Examinations in the non-pregnant condition, revealing anteversion of the uterus. Fifth pregnancy, examination in the fifth week, anteversion of the anteflexed uterus. Mechanical treatment of this displacement by manual reposition often repeated, and rest in bed during the second and third months. Successful result; regular gestation, and labour.

Case 2.—Abortion without ascertained cause. Examination several days after termination of the abortion; anteflexion. Commencement of second pregnancy; examination in the seventh week; anteversion of the anteflexed uterus. Mechanical treatment the second and third months. Successful result.

Case 3.—Two abortions in an anteflexed uterus. Dr. Hüter insists—

(1) That there does not exist a disposition to abort as the consequence of one or more abortions, but that every abortion has its own special cause, which is not always detected.

(2) That the flexion of the uterus disappears during the progress of the abortion, on which account the diagnosis of the bent uterus is only possible before the beginning of the abortion, or some days afterwards.

(3) The abortion is not caused by the bending of the uterus on itself, but through the attendant version of this organ. Therefore the treatment must be directed during pregnancy against the ante- or retro-version. In the third month the fundus uteri reaches the level of the pelvic brim.

(4) Dissection of the uterus of women who have suffered from flexion always shows chronic hyperæmia affecting the mucous membrane and paren-

chyma, and this hyperæmia is much increased by pregnancy; the return of venous blood is impeded, thus leading to congestion. This, he suggests, is the proximate cause of abortion.

2. Dr. C. Hecker contributes a memoir, chiefly controversial, and somewhat acrimonious, aimed against Dr. Rosenstein's theory, which assigns, as the cause of eclampsia, a pre-existent œdema of the brain, and then increased pressure upon the aorta. Dr. Hecker adduces two cases in opposition to this theory—

Case 1.—A primipara had two convulsive fits before being brought to hospital. She had œdema of the legs, urine copiously albuminous. She was bled; other fits followed; the uterus remained passive. An elastic catheter was passed with difficulty into the uterus, and presently pains appeared, and two more fits. A subcutaneous injection of a quarter of a grain of acetate of morphia was made. After this there was no fit, the pains strengthened, and some hours later the child was born, aided by forceps. The child cried immediately. Consciousness returned after labour; but the mind was obscured for some days. When the woman recovered she carried back her recollection to the time of her being brought into the hospital. The albumen disappeared in a few days, and she was discharged well.

Case 2.—A remarkably stout primipara had two fits before admission to hospital. No œdema. Urine albuminous. Uterus quite passive. Child alive in first position. Half-grain doses of acetate of morphia were injected under the skin. The effect was that the intervals of the fits were much protracted. During more than twelve hours there was no contraction of the uterus. Then labour set in, and after ten hours a live child was born. The patient recovered.

Hecker says, these cases prove that uterine action is not the immediate cause of the convulsions, for in both the uterus was passive; they also contradict the theory of cerebral œdema and increased aortic pressure. They are interesting as illustrations of the use of subcutaneous injection of morphia.

3. Dr. Abarbanell having related to the Obstetrical Society of Berlin a case of twin-labour protracted during three days, a discussion arose as to the propriety of accelerating the birth of the second child. Professor Martin deprecated the practice, which he represented was pursued in England, of immediately proceeding to the delivery of the second child, objecting that floodings frequently followed. Dr. Kristeller thought it a favourable circumstance when the expulsion of the two fœtuses did not follow too rapidly; the uterus could then rally its power more gradually and effectually. Several cases of lengthened intervals between the birth of the two children were mentioned; and also of severe flooding, in which no attempt to accelerate delivery had been made.

4. In the clinical report of the Munich Lying-in Hospital, it appears that in 998 labours there were 20 face-presentations. Of these 19 gave live children. Three cases are recorded in detail; the first because the face was observed to arise out of a transverse presentation, and two because they required operative aid. Of these latter, one occurred in a primipara; the second face-position remained directly in transverse diameter. Pains being unavailing, forceps was applied in the left oblique diameter, and during traction a rotation took place into the transverse diameter, so that the face was born in the normal direction. Child alive. The other case occurred in a woman aged forty-one, who had had five children. Pains very strong; face in second position, chin to left and backwards. Forceps was applied under chloroform; it was necessary to lock the blades in the transverse diameter; powerful

traction failed to move the head, and the instrument slipped off. In the meanwhile collapse set in. The hand being introduced, the head was found very large. Turning was resorted to; the head resisted much, so that perforation and cephalotopsy had to be resorted to. The patient's belly became much distended, painful; acute peritonitis set in, vomiting, and death in twenty-two hours. On section a pound of fluid blood was found in the abdomen, and the fore left half of the fundus vaginæ was torn from the uterus.

Pelvic presentations occurred seventy times—namely, 45 breech and 25 footling. 21 children were premature; 48 children were born alive; 12 died during labour; 10 bore marks of previous death.

Diseases of Pregnancy.—Two cases are detailed. In one ovarian dropsy, complicated. Premature labour set in at the sixth month. The patient died of hectic after the cyst had been punctured several times. The second case was a primipara, aged forty-two, who shortly before the term of pregnancy was affected with tuberculous pneumonia; premature labour occurred, and death four hours afterwards.

Anomalies in Uterine Contraction.—Several cases of severe pains were subdued rapidly by subcutaneous morphine injections.

Transverse presentations occurred 16 times. In two cases turning by the head was effected. In one the arm was in the vagina, the uterus quite inactive; the arm was replaced, the head pushed over the brim, and delivery effected by forceps. The child survived.

Eclampsia.—Three cases are related—1. A primipara had a first fit during the passage of the head. The urine contained much albumen and fibrin-cylinders. On the fourth day there was no albumen. The patient recovered. The treatment consisted in one bleeding and small doses of opium.

(2) A primipara, aged thirty-four, was very œdematous, and in danger of asphyxia. Pains came on, followed by fits, leaving complete unconsciousness and paralysis of the left arm, foot, and face. Treatment: Chloroform, subcutaneous injection of morphia, bleeding; delivery by forceps. The passage of the head tore the swollen perinæum. Child asphyxiated, but recovered; pneumonia followed; recovery tedious.

(3) A doubtful case.

Rupture of the Uterus.—One case is related above under "Face-presentation." A second occurred as follows: A woman, aged forty-one, had floodings in the seventh month. A live child was born. The midwife introduced her hand to extract the placenta. Immediately thereupon the patient was observed to be anæmic; pulse quiet, uterus contracted but very painful. Five hours later collapse set in, and death before medical aid could arrive. Section showed a rent in the fundus vaginæ behind and to the right, not penetrating the peritoneum.

Of fifteen *lacerations* of the perinæum, 12 were united by iron-wire sutures, and 9 healed thus by first intention.

The *forceps* was applied 58 times, or in about 6 per cent. Ten children were born dead, 23 more or less asphyxiated, and 25 alive. One mother died; it was the case of rupture already mentioned.

Puerperal history.—Twenty-two mothers fell ill, of whom nine died, or less than 1 per cent. Ten suffered from metro-peritonitis: four of anæmia, or persistent secondary hæmorrhage; three of rapid tuberculosis, two of uterine or vaginal laceration, two of Bright's disease, and one of ovarian tumour.

Two children, new-born, suffered from profuse bleeding from the bowels; one died. It had been born asphyxiated after a breech-presentation.

5. Dr. Ed. Martin gives an elaborate account of the appearances presented by the uterine and abdominal wounds made in the Cæsarian section, during and after healing. This account is chiefly drawn up from published histories.

Added is a case of Cæsarian section in which the woman recovered, dying some years later of metro-peritonitis following the induction of premature labour. The Cæsarian section was performed on a rhachitic woman, with a pelvis measuring in conjugate diameter *externally* 5¾″. The internal conjugate was estimated at 2″ 8–9‴. Mother and child recovered. In the following year, premature labour was brought on by placing a sound in the uterus. She caught cold, and smart perimetritis ensued. From this she recovered. In the following year, again pregnant, labour was induced by a succession of ten intra-uterine injections of warm water. The labour-pains were very painful, so were the after-pains, and she had a rapid pulse. Next day vomiting occurred, and several lumbrici were thrown up. Great tympanitis followed. She died eight days after the labour, and eleven after commencing to induce labour, this stage having occupied three days. In the left pleura was found over half a pound of turbid fluid containing several lumbrici. There were two openings communicating between the œsophagus and the pleura. The uterus and appendages were covered with plastic exudations. There was a solid fleshy bridge 3‴ thick, uniting the uterus to the abdominal wall, where the scar, 4″ long, resulting from the Cæsarian section was situated. Below this bridge were several old membranous exudations, and an opening with sharp edges 5‴ long, 3‴ broad, into the uterine cavity.

To the left of the bridge-like membrane the omentum was adherent to the abdominal wall. The uterine substance was sound.

IV. THE PLACENTA.

On Hyperplasia of the Placenta. By Dr. KRIEGER. (Monatsschr. f. Geburtsk., October, 1864.)

Dr. Krieger relates the case of a woman who, in her third labour, was delivered of a premature child, measuring eighteen inches, with its head, belly, and extremities dropsical. The child had a convulsion in the bath, but did not breathe, and quickly died. The placenta was expelled. A portion, the size of a dollar, only showed the aspect of normal placenta, the rest had the appearance of a hydatid mole. The single villi were drawn out to threads or stalks as long as a finger, to which bladders, filled with yellow fluid, from the size of a pea to that of a hazel-nut, were attached. The whole mass was of the size of a soup-plate. The mother recovered well. Towards the end of her fourth pregnancy she again suffered from œdematous swellings of the foot, and again was delivered prematurely. The child was dead; in the highest degree dropsical, and, moreover, had enormously hypertrophied kidneys. The villi of the placenta were again partly in hydatiginous degeneration, but the greater half was in normal condition. Again pregnant, symptoms of dropsy appeared, and the patient was more seriously inconvenienced. It was determined to bring on labour, partly to relieve the mother and partly with the hope of averting the threatened dropsy of the child. This was done by placing an elastic bougie in the uterus. A large quantity of water followed the child. The child died in half an hour. Again the placenta showed at a part of its border a row of bladdery hypertrophies of the villi.

The child's body was examined by Dr. Winckel: It appeared to be eight months old. The face and upper extremities were œdematous; abdomen tympanitic; twelve ounces of fluid in peritoneum; kidneys large, capsules easily separable; chest healthy. The placenta weighed nearly two pounds;

the parenchyma was very pale, bloodless, but without bladdery hyperplasia of the chorion-villi. The bladdery portion observed on the border after delivery had unaccountably disappeared; there was general serous infiltration.

[The especial interest of this case consists in the proof it affords that hydatiginous degeneration of the placenta does not demand, as a necessary antecedent condition, the death of the fœtus.—R. B.]

V. THE FŒTUS.

1. *Experimental Researches on the Continuance of Life of the Fœtus after the Mother's Death.* By Professor BRESLAU. (Monatsschr. f. Geburtsk., August, 1864.)
2. *The Appearances of a Scalp and Cranium in which Puncture of a Cephalhæmatoma had been made.* By Dr. HECKER. (Monatsschr. f. Geburtsk., September, 1864.)

1. Professor Breslau has attempted to solve the question, how long can the fœtus live after the mother's death? by means of experiments on the lower animals. He starts by defining "life" and "death" in the mother as well as the fœtus. Death has taken place when the movements of the heart have sunk to the minimum, when there is no peripheral circulation, when the capacity for respiration has entirely ceased, when instinctive and reflex movements no longer occur. This is "death." Another condition to be distinguished is "apparent death" ("Scheintod.") Thus, when the movements are rare, feeble, the limbs flaccid, respiration difficult, interrupted, painful, circulation weak, but still felt in the umbilical cord, and reaction slight on external irritation, the fœtus is "apparently dead." The Professor details and tabulates twenty experiments, the greater number upon guinea-pigs. The results are as follows:

a. In 9 experiments, 32 fœtuses were found all dead. The modes of death of the mothers were—in 6, asphyxia; in 1, asphyxia and hæmorrhage; in 1, chloroform narcosis; in 1, paralysis of the nervous centres. The 32 fœtuses were removed from the uterus in 1 case, two minutes after the death of the mother; in 2 cases, in four minutes; in 1 case, in five minutes; in 2 cases, in six minutes; in 3 cases, above ten minutes.

b. Two were dead, with 1 "apparently dead" in one case. The mother was poisoned by cyanide of potassium. The fœtus was extracted in the first minute after the mother's death.

c. All the fœtuses, in number 11, were "apparently dead" in 4 experiments. The mothers died, 1 by asphyxia, 1 by hæmorrhage, 2 by chloroform. The 11 fœtuses were extracted, 1 litter in the first minute after the mother's death, 1 in two minutes, 1 in four minutes and a half, 1 in five minutes.

d. Three fœtuses were apparently dead, together with six living in three experiments. The mothers died in 2 cases by hæmorrhage, in 1 by paralysis of the nerve-centres and hæmorrhage. In these 3 cases the "apparently dead" fœtuses were removed—1 in 3 minutes, 1 in 5½ minutes, 1 in 8 minutes, after the mother's death. Of the accompanying living fœtuses, 1 was removed in the first minute, 1 in 2 minutes, 1 in 2½ minutes.

e. All the fœtuses were living, 9 in number, in three experiments. The mothers died 1 by asphyxia, 1 by asphyxia and hæmorrhage, 1 by hæmorrhage. In these three experiments the fœtuses were removed living—in one case in the first minute, in 1 in 2 minutes, in 1 in about 5 minutes.

The following conclusions are drawn:

(1) The life of the fœtus always endures with a certain independence after the mother's death.

(2) The life of the fœtus in the dead mother is very quickly in great danger, which reveals itself in strong convulsive movements, taking their character, probably, from the premature respiratory movements due to the want of oxygen, and the necessity for breathing.

(3) "Apparent death," into which the fœtus commonly falls in the first minute after the mother's death, may be continued in the uterus in extreme cases as long as 8 minutes; but mostly death occurs much earlier.

(4) The fœtuses removed, "apparently dead," from the body of the dead mother, are nearer to death than to life, for they do not recover by themselves, but quickly, almost without exception, perish.

(5) Only seldom, and in the most favourable case, will the young be removed alive within 5 minutes after the mother's death. Even in the third minute the probability of extracting a live fœtus is very small.

(6) If we operate later than 5 minutes, we cannot extract a living fœtus; if we operate later than 8 minutes after the mother's death, not even an "apparently-dead" fœtus can be extracted; the young are by that time always dead.

(7) The mode of death of the mother seems not to be without influence upon the life and death of the fœtus. Death by asphyxia is unfavourable to the fœtus; death by hæmorrhage more favourable, so also death by chloroform, and by paralysis of the nerve-centres.

(8) It appears to be of consequence for the persistence of life whether the fœtus be mature or immature, but the experiments could not determine this matter.

With regard to the applications to the human fœtus and to practical obstetrics, Breslau submits:

(1) That there is no doubt that the human fœtus, like the brute, always survives its mother when the mode of death is rapid and violent, as from bleeding, blows on the head, apoplexy, &c.

(2) Daily experience shows that the power of resistance of the human fœtus is greater than that of the brute.

(3) The duty of every physician is, after the ascertained death of the mother, to perform the Cæsarian section as quickly as possible, in order to save the child's life. The Cæsarian section may, however, be avoided when the previous death of the fœtus is certain, or when the fœtus may more readily be delivered by the natural passages.

(4) The Cæsarian section will give no prospect of a living or of an "apparently dead" child, if not performed within the first fifteen or twenty minutes after the mother's death.

(5) If the mother have died from disease, as from cholera, typhus, puerperal fever either during pregnancy or labour, scarlatina, small-pox, &c., there is no hope of saving the child's life. The same will be the case in those poisonings of the mother which effect a rapid decomposition of the blood, and which affect the child, as by hydrocyanic acid. Chloroform-death appears to be an exception, since chloroform, as such, does not pass into the fœtal circulation, of which one may be convinced by any labour completed under chloroform-narcosis.

In the discussion upon this memoir in the Berlin Obstetrical Society, Professor Martin observed that in none of the four cases in which he had performed Cæsarian section after the mother's death was a living child extracted. In one the operation was completed within ten minutes; in one it was done "very soon;" in the remaining two it was done within half an hour.

Dr. Boehr referred to a collection of cases in 'Casper's Wochenschrift,' in which out of 147 cases only 3 instances of living children occurred.

2. Prof. Hecker describes his treatment of cephalhæmatoma to be as follows:—He makes a slight puncture from the eighth to the tenth day, uses no compression, and, in the event of a considerable reaccumulation of blood, he makes a further puncture after an interval of eight or ten days. He says the expectative method has no advantage, and leaves an unsymmetrical bone-tumour, which may remain for years. In a preparation presented, which came from a very large cephalhæmatome which had been emptied by a small puncture, the pericranium had been applied to the bone at its margins on the third day without any pressure being used; the blood which had gathered afterwards had been emptied by a second puncture five days later, and thus complete healing had taken place. The perfect union of the pericranium and bone was seen in the preparation, and only small osteophytes remained. The child died of a different disease. The Professor insists that the opening should be a small puncture, and not an incision.

VI. SUMMARY.

The following memoirs, either for want of space or because they can be found in readily accessible journals, are referred to by title only.

On a Fibroïd Tumour of the Uterus Removed by Extraction. By Dr. Riedel. (Monatsschr. f. Geburtsk., September, 1864.)

A Monster with Eventration. By Dr. Max Dehn. (Monattschr. f. Geburtsk., September, 1864.)

Report on the Present State of Midwifery and Gynæcology in Great Britain and Ireland. By Dr. Gusserow. (Monatsschr. f. Geburtsk., October, 1864.)

On Ovarian Cysts. By Dr. Saxinger. (Prag. Med. Wochenschr., 1864.)

On the Treatment of Ovarian Tumours. By O. Von Franque. (Wien. Med. Halle, 1864.)

Retrospect of the Events in the Viennese Lying-in Hospital during the last Thirty Years. (Wiener Med. Jahrb., 1864.)

On Change of the Air and the new Ventilation Scheme in the Vienna Clinique for Midwifery. By C. Braun. (Wiener Med. Jahrb., 1864.)

On Dysmenorrhœa Villosa. By Professor Hennig. (Monatsschr. f. Geburtsk., August, 1864.)

Circumscribed Phlebitis of the Lower Extremity after Labour. By Dr. Hayden. (Dublin Quarterly Journal of Medical Science, November, 1864.)

Case of Labour with complete Occlusion of the Vagina, successfully treated by Incisions. By Dr. Cronyn. (Dublin Quarterly Journal of Medical Science, November, 1864.)

On the Advantages of the more extended use of Version in Cases of Disproportion. By Dr. Andrew Inglis. (Edinb. Med. Journ., Dec., 1864.)

On the Weight and Length of the Newly-born Child in relation to the Mother's Age. By Dr. Matthews Duncan. (Edinb. Med. Journal, Dec., 1864.)

On Life without Respiration in certain Newly-born Children. By Dr. Bardinet. (Arch. Gén. de Méd., Dec., 1864.)

CONTRIBUTIONS TO MEDICAL LITERARY HISTORY.

ADVERSARIA MEDICO-PHILOLOGICA.

BY W. A. GREENHILL, M.D. OXON.

(*Continued from vol. xxxiv., p. 560.*)

ἡ ἀκρωμία, or *τὸ ἀκρώμιον*, two forms of a Hippocratic word, which are used synonymously to signify the large process terminating the spine of the scapula, still called the *acromion*. The author of the treatise 'De Articulis' (probably Hippocrates himself) calls it[1] "the bond of connexion between the clavicle and the scapula," which definition is repeated by Rufus Ephesius.[2] It is not unlikely that Hippocrates supposed the acromion to be a distinct and separate bone, which constituted a difference between man and other animals.[3] Eudemus, who lived somewhat later, certainly thought so;[4] probably Galen also, who (speaking apparently in his own person) calls it a cartilaginous bone;[5] elsewhere,[6] however, he seems to consider it only as a prolongation of the spine of the scapula, in which he is followed by Theophilus.[7] The word is frequently met with in Galen,[8] especially in the 'De Anat. Admin.;'[9] also in Oribasius,[10] Paulus Ægineta,[11] and Meletius;[12] from which passages it appears that it was sometimes used rather vaguely. Whenever it has any strict and definite sense, it is probably that which is given above.

If the reading *ἀκρώμιον ἁρμονίαν* in Galen[13] is correct, there would appear to be an adjective, *ἀκρώμιος*, though no such is recognised by Liddell and Scott. The meaning of the word has been discussed by Vesalius,[14] Littré,[15] Adams,[16] and others.

ἀλλαντοειδὴς ὑμήν, or *χιτών* (never *μῆνιγξ*, as Kraus[17] asserts), a name applied to one of the membranes of the fœtus, still called the *allantoid*. The name is derived from its somewhat resembling an *ἀλλᾶς*, or *sausage*,[18] and is sometimes rendered in Latin *farciminalis*.[19] It is described by Galen in the three passages referred to below, who is copied by Aëtius[1] and Theophilus.[2] In the notes to Theophilus (p. 332), I said that I had not found the word in any writer earlier than Galen; but it is used by Soranus.[3] It is one of the words discussed by Kühn in his 'Censura Medicorum Lexicorum Recentiorum.'[4]

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[1] § 13, tome iv. p. 116, l. 5, ed. Littré.

[2] P. 29, l. 1. See also p. 50, l. 10, ed. Clinch.

[3] 'De Artic.,' loco cit.; 'Mochl.,' § 1, tome iv. p. 344, l. 2, ed. Littré. See Galen, 'Comment. in Hippocr. "De Artic.,"' i. 61, tom. xviii. pt. i. p. 400, l. 3.

[4] Rufus Ephes., p. 29, l. i.

[5] Loco cit., p. 400, l. 5. See also 'De Oss.,' cap. 14, tom. ii. p. 766, l. 11; 'De Anat. Admin.,' v. 2, tom. ii. p. 491, l. 8; 'De Usu Part.,' xiii. 11, tom. iv. p. 128.

[6] 'De Usu Part.,' xiii. 10, tom. iv. p. 122, l. 2, &c.

[7] 'De Corp. Hum. Fabr.,' v. 9, § i. p. 198, l. 4.

[8] See Index to Kühn's edition.

[9] Tom. ii. p. 421, l. 13; 446.8; 447.4; 466.17; 469.13, 18; 487.1, 3; 488.15; 490.10; 491.6; 679.5.

[10] Bk. xxv., taken almost entirely from Galen, tome iii. p. 410, ll. 9, 11; 411.1; 422.10; 432.5; 434.6; 455.4, ed. Daremberg; and xlvii. 3, tome iv. p. 213.

[11] Lib. vi. cap. 113, p. 454, ed. Briau.

[12] 'De Hom. Fabr.,' cap. 27, p. 119, ll. 2, 3, ed. Cramer.

[13] 'De Oss.,' cap. 15, tom. ii. p. 766, l. 10.

[14] 'De Hum. Corp. Fabr.,' lib. i. cap. 21.

[15] 'Œuvres d'Hippocr.,' tome iv. p. 10, &c.

[16] Commentary on Paulus Ægineta, vi. 113, vol. ii. p. 483.

[17] 'Kritisch-etymol. Medicin. Lex.'

[18] Galen, 'De Uteri Dissect.,' c. 10, tom. ii. p. 902, l. 11; 'De Usu Part.,' xv. 5, tom. iv. p. 231, l. 8; 'De Sem.,' i. 7, tom. iv. pp. 538, 539.

[19] Aëtius, translated by Cornarius, tetrab. iv. serm. 4, cap. 3, p. 781 C, ed. H. Steph.

ἀλώπηξ, *a fox*, plur. *ἀλώπεκες*, a curious and very ancient name given to the psoas muscles, the origin of which is unknown. It was found in the 'Cnidian Sentences,' a treatise at least as old as the time of Hippocrates, and also in an author quoted by Rufus Ephesius,[5] Athenæus,[6] and Julius Pollux,[7] by the names *Clearchus* and *Cleitarchus*, both of which (*one* being wrong) no doubt refer to the same person.

ἀμαρθρῖτις, a word used by Cælius Aurelianus,[8] signifying universal gout, or gout affecting several joints at once. It is omitted in most lexicons.

ἀμαύρωσις ὀμμάτων in the Hippocratic Collection[9] probably means simply *dimness* of sight; and even where what we should call *amaurosis* seems to be mentioned, the Greek word *ἀμαύρωσις* is not used.[10] Afterwards it got a more precise signification, and was explained to mean[11] "a complete impediment of the sight without any manifest cause." This definition is repeated in almost the same words by Paulus Ægineta[12] and Joannes Actuarius,[13] and with some variation by Aëtius,[14] and agrees with the explanation given by Galen himself.[15]

ἀμνεῖος[16] *χιτάν*, or *ὑμήν*, the name of the innermost membrane surrounding the fœtus, first used by Empedodes,[17] and still retained. It is sometimes written *ἀμνίος*,[18] but much more generally *ἀμνεῖος* in the present text of Soranus,[19] Galen,[20] Oribasius,[21] and Theophilus.[22] It is doubtful whether *τὸ ἀμνίον*, the neuter substantive, is ever used in this sense.

ἀμφημερινὸς πυρετός, *quotidian fever*, a name found in the Hippocratic Collection,[23] and adopted by all subsequent ancient writers on fevers, most of whom are enumerated by Adams in his Commentary on Paulus Ægineta.[1] Galen says that in his time some physicians had begun to call those quotidian fevers in which the intermission was incomplete by the names *καθημερινός*, or *μεθημερινός*, but he adds that this was not the practice of the ancients, and that he himself preferred the names *ἀμφημερινὸς συνεχής* and *ἀμφημερινὸς διαλείπων*,[2] whenever it was necessary to intimate that the intermission was partial or complete.

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[1] Loco cit. [2] 'De Corp. Hum. Fabr.,' v. 19, 20.

[3] 'De Arte Obstetr.,' c. 21, p. 68, ed. Dietz.

[4] 'Opusc. Acad. Med. et Philol.,' vol. ii. p. 370.

[5] 'De Part. Corp. Hum.,' p. 40, l. 12, &c., ed. Clinch. In this passage there are several manifest errors, which are corrected by Ermerins, Hippocr. 'De Vict. Rat. in Morb. Acut.,' p. 101, and Littré, 'Œuvres d'Hippocr.,' tome iv. p. 65.

[6] 'Deipnos.,' ix. 59, p. 399.

[7] 'Onomast.,' ii. 4, § 185.

[8] 'Morb. Chron.,' lib. v. cap. 2, p. 557.

[9] 'Coac. Prænot.,' §§ 221, 222; 'Prorrh.,' § 13, tome v. pp. 546, 632, ed. Littré.

[10] 'De Visu,' § 8, tome ix. p. 158.

[11] Pseudo-Galen, 'Introd.,' c. 16, tom. xiv. p. 776, l. 8.

[12] Lib. iii. c. 22, p. 35 B, l. 52, ed. Ald.

[13] 'De Meth. Med.,' ii. 7, p. 184 E, ed. H. Steph.

[14] vii. 2, p. 124, l. 14, ed. Ald.

[15] 'Comment. in Hippocr. "Prorrhet. I.,"' ii. 45, tom. xvi. p. 609, l. 13.

[16] The accentuation of Liddell and Scott has been adopted.

[17] Rufus Ephes., 'De Part. Corp. Hum.,' p. 45, ed Clinch; Julius Pollux, 'Onomast.,' ii. 4, § 223.

[18] Ruf. Eph., and Jul. Poll., locis cit.; also Galen, 'De Usu Part.,' xv. 4, 5, tom. iv. p. 224, l. 9; 232.12, 16; 233.1, 7.

[19] 'De Arte Obstetr.,' cc. 21, 22, p. 68, l. 13; p. 70, l. 22.

[20] 'De Uteri Dissect.,' cap. 10, tom. ii. p. 902, l. 11; 908.1; 'De Sem.,' i. 10, tom. iv. p. 547, l. 13; 'De Fœt. Form.,' cap. 2, tom. iv. p. 657, l. 15; 'De Hipp. et Plat. Decr.,' vi. 6, tom. v. p. 555, l. ult.

[21] 'Coll. Medic.,' xx. 8, §§ 11, 12, 13, tome iii. p. 75, l. 12; p. 76, ll. 5, 10.

[22] 'De Corp. Hum. Fabr.,' v. 19, § 2, p. 211, l. 5; 20, § 3, p. 214, l. 7.

[23] 'Epid.,' i. 2, § 4, tome ii. p. 622, l. 2; 'De Nat. Hom.,' § 15, tome vi. p. 66, ed. Littré.

ἀμφιβληστροειδὴς χιτών, *tunica retiformis*, a name that owes its origin to Herophilus, who compared a part of the eye to a casting-net (*ἀμφίβληστρον*),[3] "on account of the disposition of the vessels and its form." It is impossible to decide exactly what part of the eye is meant when the word is found in ancient authors, as they had no very distinct ideas themselves of the complicated anatomy of this organ. Accordingly, it sometimes appears to mean the *retina*, sometimes the *hyaloïd membrane*, sometimes both these delicate parts, which were not very accurately distinguished. Rufus Ephesius[3] says it contains the hyaloïd humour, and is synonymous with *ἀραχνοειδής* and *ὑαλοειδής*, by which names he designates the "third" membrane of the eye. This description plainly refers to the hyaloïd membrane. On the other hand, Galen[4] distinctly calls it an expansion of the optic nerve, and therefore as evidently refers to the retina. He also in another passage[5] distinguishes the *ἀμφιβληστροειδής* from the *ἀραχνοειδής*, which two words Rufus Ephesius and Julius Pollux[6] considered to be synonymous. Oribasius[7] transcribes Galen's description. In Leo,[8] Meletius,[9] and Joannes Actuarius,[10] the retina is intended. The meaning of the word is discussed by Kühn,[11] who seems to consider that it *never* means the retina, which certainly is not correct. Dr. Daremberg mentions the uncertainty that belongs to the anatomical knowledge of the eye exhibited by ancient authors.[12]

ἀνάβασις, when applied to a disease means the second period (sometimes called *ἐπίδοσις*, or *αὔξησις*), when it is increasing in severity; the other stages being the *ἀρχή*, *ἀκμή*, and *παρακμή*.[13]

ἀναβατικὸς σύνοχος is synonymous with *ἐπακμαστικός*, and signifies a species of continued[14] fever in which the amount of heat gradually increases throughout the attack.[15]

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[1] Lib. ii. cap. 1, vol. i. p. 187.

[2] 'De Differ. Febr.,' ii. 7, tom. vii. pp. 354, 355; 'Comment. in Hippocr. "Epid. I.,"' iii. 2, tom. xvii. A. p. 221.

[3] Rufus Ephes., 'De Part. Corp. Hum.,' p. 37, l. 1; p. 56, l. 15.

[4] 'De Usu Part.,' viii. 6; x. 1, 2, tom. iii. p. 639, l. 10, p. 762, l. 1, &c.; 'De Hippocr. et Plat. Decr.,' vii. 4, tom. v. p. 624, l. 10.

[5] 'De Meth. Med.,' i. 6, tom. x. p. 47, l. 16.

[6] 'Onomast.,' ii. 13, § 71.

[7] 'Coll. Med.,' xxiv. 2, tome iii. p. 295, l. 10, ed. Daremb.

[8] 'Consp. Medic.,' iii. 1, p. 129, ll. 23, 25, in Ermerins, 'Anecd. Med. Gr.'

[9] 'De Hom. Fabr.,' c. 2, p. 63, ll. 9, 24, in Cramer's 'Anecd. Gr.,' vol. iii.

[10] 'De Spir. Anim.,' i. 8, § i. in Ideler's 'Med. et Phys. Gr. Min.,' vol. i. p. 327, l. 6.

[11] 'Opusc. Acad. Med. et Philol.,' vol. ii. p. 353.

[12] 'Œuvres de Galien,' tome i. p. 612.

[13] Galen, 'De Cris.,' i. 3, 8, tom. ix. p. 556, l. 14; p. 581, l. 3; 'De Morbor. Tempor.,' c. 2; 'De Totius Morbi Tempor.,' cc. 1, 3, tom. vii. p. 411, l. 12; 440.3; 445.11; 'Comment. in Hippocr. "De Humor."' i. 3; ii. 14, tom. xvi. p. 70, l. 13; p. 257, l. 7; Pseudo-Synesius, 'De Febr.,' p. 72, l. ult.

[14] In order to prevent misapprehension, it should be stated that *σύνοχος* here and above (see *ἀκμαστικὸς σύνοχος*) is used in the sense given it by Galen, to signify simply a fever in which there is neither intermission (*διαλείπων πυρετός*) nor remission (*συνεχὴς πυρετός*), but perfect continuity; what exact species of fever in the nomenclature of modern nosologists were included under this name it may perhaps be necessary to determine hereafter, when the word *σύνοχος* is examined, but in the meantime this explanation is sufficient.

[15] Galen, 'De Differ. Febr.,' ii. 2, tom. vii. p. 337, l. 3.

ἀναβροχίζω, *to catch in a loop*, to perform the operation of ἀναβροχισμός.[1]

ἀναβροχισμός, an ancient operation for trichiasis, described by Paulus Ægineta,[2] but no longer in use. It is mentioned also by Galen,[3] and has been particularly examined by several modern writers—e.g., Kühn,[4] Littré,[5] and Ermerins.[6]

ἀνάγειν αἷμα is merely to *bring up* blood, whether by vomiting or by coughing.[7] The use both of the verb ἀνάγω and of the substantive ἀναγωγή in the Hippocratic Collection is explained by Foësius.

ἀναγωγὴ αἵματος is sometimes merely the *bringing up* of blood, whether by vomiting or by coughing;[8] and this etymological meaning of the word was probably strictly observed, as Cælius Aurelianus[9] particularly notes that it signifies "ex inferioribus ad superiora fluorem." It was perhaps in this general sense that Erasistratus[10] used the word in the title of one of his works. Sometimes the word is applied particularly to hæmoptysis,[11] sometimes to hæmatemesis.[12] In Aretæus,[13] ἀναγωγὴ πτυέλων and ἀναγωγὴ φλεγμάτων signify, of course, *expectoration*.

ἀναισθησία, *insensibility*, *want of sensation*,[14] as a symptom of disease; used in the plural by Galen,[15] in the same sense. Sometimes it is used as the name of a disease,[16] opposed to πάρεσις.

ἀναίσθησις, which is omitted in most lexicons, is used by Aretæus[17] as synonymous with ἀναισθησία.

ἀναίσθητος, signifies a person *insensible*, *without sensation*, and is opposed in Aretæus[18] to εὐαίσθητος. In another passage of the same author,[19] ἀναίσθητος ἡ ἁφή means, *the sense of touch is lost*.

The *insensibility* mentioned in these passages was caused by disease, not by artificial means; and accordingly the word ἀναισθητικός (*anasthetic*) is probably nowhere used by any ancient writer. The word is, however, a perfectly legitimate compound and derivative; for as αἰσθητικός signifies that which *gives* sensation (as αἰσθητικὰ νεῦρα), so ἀναισθητικός may fairly be used to signify that which *takes it away*.[20]

ἀνὰ σάρκα, or ἀνασάρκα, signifies that species of dropsy which still retains the name *anasarca*. It was a new term in the time of Galen, who says he had nowhere found it in any author, but that it was used by modern physicians.[1] Probably the earliest extant writer who has employed the name is Aretæus,[2] who was either a contemporary of Galen, or slightly anterior to him. After his time it became one of the recognised names for anasarca—perhaps the most common—and is used by Alexander Trallianus,[3] Stephanus Atheniensis,[4] Theophilus,[5] Paulus Ægineta,[6] Leo,[7] and Joannes Actuarius.[8] The name was no doubt at first *ὁ ἀνὰ σάρκα ὕδερος*,[9] *the dropsy throughout the flesh*, or *ὁ ἀνὰ σάρκα καλούμενος ὕδερος*,[10] *the so-called dropsy throughout the flesh*; then the *ὕδερος* was dropped, and *ὁ ἀνὰ σάρκα* alone was used.[11] Lastly, the two words, *ἀνὰ σάρκα*, were united to form one (*ἀνασάρκα*),[12] which seems to have been considered as a substantive, so that in one place[13] (if the reading is correct) we meet with *ἀνασάρκας* as the accusative plural.

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[1] Pseudo-Galen, 'Introd.,' c. 19, tom. xiv. p. 784, l. 2.

[2] Lib. vi. cap. 13, where see Adams's Commentary, vol ii. p. 270.

[3] 'Comment. in Hippocr. "De Vict. Rat. in Morb. Acut.,"' iv. 105, tom. xvi. p. 918, l. 12, where the word is wrongly written ἀναβρογχισμόν.

[4] 'Opusc. Acad. Med. et Philol.,' vol. ii. p. 354.

[5] 'Œuvres d'Hippocr.,' tome iii. p. xliv.

[6] Hippocr. 'Opera,' vol. i. p. 360.

[7] Leo, 'Conspect. Medic.,' iv. 18, in Ermerins, 'Anecd. Med. Gr.,' p. 163, l. 18.

[8] Leo, ibid., l. 17.

[9] 'Morb. Chron.,' ii. 9, p. 389, l. ult. So also Aretæus, 'De Caus. Morb. Acut.,' ii. 2, p. 23, l. 24, ed. Adams.

[10] Galen, 'De Libris Propriis,' c. 1, tom. xix. p. 14, l. 7.

[11] Dioscor. 'Eupor.,' ii. 29, 30, tom. ii. p. 238, l. 14; p. 239, l. 7, ed. Sprengel.

[12] Galen, 'De Compos. Medicam. sec. Locos,' vii. 4, tom. xiii. p. 75, l. 7.

[13] 'De Sign. Morb. Acut.,' i. 10, p. 17, ll. 2, 12, ed. Adams.

[14] Aretæus, ibid., 5, p. 6, l. 6.

[15] 'Comment. in Hippocr. "Epid. III.,"' i. 4, tom. xvii. A. p. 522, l. 5.

[16] Aretæus, 'De Caus. Morb. Chron.,' i. 7, p. 62, l. 21.

[17] 'De Cur. Morb. Acut.,' i. 4, p. 149, l. 19.

[18] 'De Caus. Morb. Chron.,' ii. 12, p. 119, l. 7. [19] Ibid. i. 7, p. 66, l. 18.

[20] The monstrous word *anesthésique*, which is to be found in two recent French Medical Dictionaries of repute, if admitted at all, ought certainly to have been accompanied by a protest!

The name is synonymous with *λευκοφλεγματία* or *λευκὸν φλέγμα*,[14] with *ὕδερος*,[15] *κατὰ σάρκα* or *catasarca*,[16] *ὑπὸ σάρκα* or *ὑποσάρκα*,[17] *ὑποσαρκίδιος ὕδερος*,[18] *intercus*,[19] &c.; but none of these names have been generally adopted.

ἀναστομόω φλεβά[20] or *ἀγγεῖον*,[21] is to *open the mouth* of a vein or vessel, so as to allow the blood to ooze out. It is used also in the passive voice in a similar sense.[22] Sometimes it means *to anastomose*, or unite by anastomosis, in the modern sense of the word,[23] and is applied to the communication between the arteries and veins. In this sense the word *συναναστομόω* is also used.[24] Sometimes (in the passive) it appears to mean *to be dilated*, without suffering the blood to escape, as in a passage of Galen,[1] where it is opposed to *τρωθείσης*, and answers to *ἀνευρυνθείσης* in Antyllus.[2]

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[1] 'Comment. in Hippocr. "De Vict. Rat. in Morb. Acut.,"' iv. 93, tom. xv. p. 891, l. 2.

[2] 'De Caus. Morb. Chron. ii. 1, p. 92, ll. 15, 18, 21; p. 93, ll. 14, 22.

[3] Lib. ix. cc. 1, 2, p. 512, l. 18; p. 513, l. 5, ed. Basil.

[4] 'Schol. in Hippocr. "Prognost.,"' in Dietz, 'Schol. in Hippocr. et Gal.,' vol. i. p. 128, ll. 31, 32; p. 131, l. 21.

[5] 'Comment. in Hippocr. "Aphor.,"' in Dietz, ibid. vol. ii. p. 490, l. 17.

[6] Lib. iii. cap. 48, p. 48, B. ll. 45, 49.

[7] 'Conspect. Medic.,' v. 23, p. 185, l. 13, in Ermerins, 'Anecd. Med. Gr.'

[8] 'De Meth. Med.,' v. 6, 8, pp. 258 b, 270 g, ed. H. Steph.

[9] Stephanus Atheniensis, loco cit.

[10] Galen, 'De Caus. Symptom.,' iii. 4, tom. vii. p. 231, l. 9. See also 'De Simplic. Medic. Temper. ac Facult.,' xi. 1, tom. xii. p. 321, l. 12.

[11] Galen, 'Comment. in Hippocr. "De Rat. Vict. in Morb. Acut.,"' iv. 93, tom. xv. p. 892, l. 9.

[12] Galen, 'De Natur. Facult.,' i. 11, tom. ii. p. 24, l. 15; 'Defin. Med.,' c. 279, tom. xix. p. 424, l. 7.

[13] Galen, 'De Ther. ad Pis.,' c. 15, tom. xiv. p. 275, l. 18.

[14] See Foësii 'Œcon. Hippocr.,' in v. λευκοφλεγματια.

[15] Cælius Aurelianus, 'Morb. Chron.,' iii. 8, p. 468, ed. Amman; Galen, passim.

[16] Galen, loco cit., tom. xv. p. 891, l. 2; Cæl. Aurel., pp. 468, 469.

[17] Celsus, 'De Medic.,' iii. 21; Cæl. Aurel., p. 468.

[18] Hippocrates, 'De Vict. Rat. in Morb. Acut.,' Append. § 20, tome ii. p. 496, l. ult. ed. Littré; 'De Morb.,' i. 3, tom. vi. p. 144, l. 5; Paulus Ægineta, lib. iii. cap. 48, p. 48 B. l. 45.

[19] Cæl. Aurel., p. 470, l. 8.

[20] Galen, 'De Atrâ Bile,' c. 4, tom. v. p. 117, l. ult.

[21] Id. 'De Caus. Symptom.,' iii. 5, tom. vii. p. 233, l. 14.

[22] Galen, 'De Differ. Symptom.,' c. 6, tom. vii. p. 79, l. 15; 'De Meth. Med.,' v. 2, tom. x. p. 311, l. 8; 'Comment. in Hippocr. "De Humor,"' iii. 31, tom. xvi. p. 475, l. 14; Leo, 'Conspect. Medic.,' v. 11, in Ermerins, 'Anecd. Med. Gr.,' p. 177.

[23] Galen, 'De Usu Part.,' vi. 17, tom. iii. p. 495, l. 15.

[24] Galen, ibid., p. 492, l. 14.

ἀναστόμωσις had three very different meanings, derived from the three senses of *ἀναστομόω*, given above.

1. One of the species of hæmorrhage recognised by the old writers,[3] rendered by Cælius Aurelianus[4] *osculatio*, and explained by Celsus to apply to hæmorrhage "ore alicujus venæ patefacto."[5] This sense of the word is at least as old as the time of Erasistratus, who was perhaps the author of it.[6]

2. *Anastomosis*, in the modern sense of the word, or the communication between the arteries and veins, as if by the mouths or open ends of the one set of vessels being joined to those of the other.[7] This communication was perfectly familiar to Erasistratus, who, however, believed that the arteries contained only air; it is also discussed at some length by Galen, who knew that the arteries contained blood: all which makes it the more surprising that the circulation of the blood should have been so long undiscovered.

3. Simple *dilatation*, without any escape of blood, in the passage of Paulus Ægineta before referred to,[8] synonymous with *ἀνευρυσμός* and *ἀνεύρυνσις* in Antyllus.[9]

ἀναστομωτικός, calculated to open or dilate the mouths of vessels, applied chiefly to medicines,[10] rendered by Cælius Aurelianus, "medicamina *osculantia, provocativa, apertiva*."[11] The expression *ἀναστομωτικὴ δύναμις* is used by Galen.[12] In the Hippocratic Collection the word *ἀναστομωτήριος*[13] is used in the same sense as *ἀναστομωτικός*; but *ἀνάστομος*, which is inserted in some lexicons, and from which comes the word *ἀναστομωτέρων*, formerly found in the Hippocratic Collection,[14] is probably no genuine word. It is not recognised by Liddell and Scott, and in his edition of Hippocrates, Littré has *ἀστομωτέρων*, which is no doubt the correct reading.

ἀνευρυσμός, a dilatation, synonymous with *ἀνεύρυνσις*, and, when applied to an artery, constituting *ἀνεύρυσμα, aneurysm*.[15]

ἀνεύρυσμα, an aneurysm, in the modern sense of the word, is probably not to be found in any author earlier than Rufus,[1] who, however, only mentions the affection incidentally. It occurs several times in Galen's works.[2] In one place two causes are assigned for the affection—viz., *anastomosis* and a *wound*,[3] which apparently correspond with those mentioned by Antyllus—viz., *dilatation* and *rupture*.[4] Freind considers that no Greek writer believed an aneurysm ever to proceed from dilatation of the artery; and he refers to the above-mentioned passage of Paulus Ægineta, in which he considers that ἀναστόμωσις necessarily implies that the blood was extravasated.[5] He may possibly be right with respect to the meaning of Galen and Paulus Ægineta (though upon the whole it seems more probable that he is wrong), but the passage from Antyllus (which, however, was not published till long after his death)[6] proves that his supposition that no Greek author mentions dilatation as one of the causes of aneurysm was mistaken. Besides Adams's Commentary there is a valuable note by Dr. Daremberg[7] on the meaning of the passage in Paulus Ægineta, which is also quoted by Oribasius.

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[1] 'De Tumor. præt. Nat.,' c. 11, tom. vii. p. 725, l. 4. This passage is quoted by Oribasius ('Coll. Medic.,' xlv. 23, § 1, tome iv. p. 51, ed. Daremberg) and by Paulus Ægineta (vi. 37, p. 180, ed. Briau), and appears to have been misunderstood by Freind, when he says ('Hist. of Physic,' vol. ii.) that Fernel was the first person who attributed aneurysm to dilatation. See Briau's Note on Paulus Ægineta, loco cit. See also the explanation of *ἀνεύρυσμα* on this page.

[2] In Oribasius, 'Coll. Medic.,' xlv. 24, § 1, tome iv. p. 52.

[3] Galen, 'De Caus. Symptom.,' iii. 5, tom. vii. p. 232, l. 1; 'De Meth. Med.,' iv. 1, v. 2, tom. x. p. 233, l. 1; p. 311, ll. 4, 12, 17; 'Comment. in Hippocr. "De Humor."' iii. 31, tom. xvi. p. 478, l. 5; 'Defin. Med.,' c. 461, tom. xix. p. 457, l. 3.

[4] 'Morb. Chron.,' ii. 10, § 121.

[5] 'De Medic.,' iv. 11, p. 134, ed. Daremberg.

[6] Cælius Aurelianus (loco cit.) says that some persons acknowledged only two kinds of hæmorrhage—viz., "*eruptio* et *putredo*, ut Asclepiades;" others three—viz., "*eruptio* et *putredo* et *osculatio*, ut *Erasistratus*."

[7] Galen, 'De Usu Part.,' vi. 17, tom. iii. pp. 492, 493, 494.

[8] vi. 37, p. 180, l. 11, ed. Briau.

[9] In Oribas. 'Coll. Med.,' xlv. 24, tome iv. p. 52, l. 11; p. 53, l. 1.

[10] Celsus, v. 18, § 35; Galen, 'De Simplic. Medicam. Temper. ac Facult.,' v. 14, tom. xi. p. 749, &c.

[11] 'Morb. Chron.,' ii. 10, § 123; 'Morb. Acut.,' iii. 4, § 40.

[12] Loco cit., p. 750, l. 12.

[13] 'De Nat. Mul.,' § 109, tome vii. p. 428, l. 2.

[14] 'De Morb. Mul.,' i. 1, tome viii. p. 12, l. 3, ed. Littré.

[15] Galen, 'Defin. Med.,' c. 378, tome xix. p. 441; Antyllus, in Oribas. 'Coll. Med.,' xlv. 24, tom. iv. p. 52, l. 12; p. 53, ll. 1, 11.

MEDICAL INTELLIGENCE.

The Leprosy Committee of the College of Physicians.

We have had an opportunity of seeing the condensed replies to the interrogatories of the College, printed by the Colonial Office for the use of the Committee in the preparation of their final report. A few replies are still looked for, and it is only within the last month or so that those from British Guiana and from the Madras presidency have come to hand. The array of evidence already received is most varied and extensive, comprising returns from all our West India colonies—from the Cape of Good Hope, Sierra Leone, and several places on the North Coast of Africa—from Syria and Palestine, including Jerusalem, Damascus, and Aleppo—from Crete, Rhodes, and other islands of the Mediterranean Archipelago—from Constantinople, Tabreez, Hong Kong, and other places in China—from the Bombay and Madras presidencies—and from Australia and the Mauritius. Perhaps none of the returns are more deeply interesting than those from New Brunswick, the only province of North America, as far as we know, where the malady is known to exist. In various regions in South America it prevails most extensively. But no official information appears to have been received by the Committee from Brazil, &c., nor yet from those countries of Europe which are still afflicted with leprosy, such as Norway, Spain, Portugal, &c. The present inquiry is therefore far from overtaking the entire geography of this nearly world-wide disease. So much the better, as other Governments and other medical corporations may be stimulated by the example thus set by our own to institute similar researches in their colonial and foreign possessions; and what Norway did a few years ago in respect of her domestic population, might with great advantage be followed by several countries in the South of Europe.

Hitherto, the attention of the medical profession has not been so directed to the investigation of the disease as the importance of the subject, on grounds alike of science and of humanity, demands; and everywhere much ignorance and error prevail in the popular mind as to the circumstances and conditions which favour its development and continuance, and as to the proper management of the sufferers. In almost every country they are looked upon with mere abhorrence, and too often are dealt with rather as criminals and outcasts than as the victims of disease. It is to be hoped that the Committee will be enabled, from the large store of authentic evidence before them, to throw light on much that is at present obscure in the history of the malady, and thus lead the way to a more rational and humane treatment of the poor leper. The preparation of their report will be one of no small labour, and will necessarily occupy much time; but, if worthily done, the work cannot fail to prove of no ordinary interest to the legislator and philanthropist, as well as to the medical philosopher.—*Dec. 20th*, 1864.

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[1] In Aëtius, iv. 2, § 51, pp. 716 E, 717 E, ed. H. Steph.

[2] ‘De Meth. Med.,’ v. 7, tom. x. p. 335, ll. 13, 14; ‘De Cur. Rat. per Ven. Sect.,’ c. 22, tom. xi. p. 313, l. 15; ‘Defin. Med.,’ c. 378, tom. xix. p. 441.

[3] ‘De Tumor. præt. Nat.,’ c. 11, tom. vii. p. 725; quoted by Oribasius, ‘Coll. Med.,’ xlv. 25, tome iv. p. 51, and by Paulus Ægineta, vi. 37, p. 180, ed. Briau.

[4] In Oribasius, loco cit., c. 24, p. 52, ll. 10, 11.

[5] ‘Hist. of Physick,’ vol. i. p. 132, &c.

[6] In Cardinal Mai's ‘Classici Auctores e Codicibus Vaticanis editi,’ tom. iv. 1831.

[7] Oribas., tom. iv. p. 660.

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The Morningside Mirror, Vol. XIX. Nos. 11 to 12.

THE

BRITISH AND FOREIGN

MEDICO-CHIRURGICAL REVIEW.

APRIL, 1865.

PART FIRST.

Analytical and Critical Reviews.

REVIEW I.

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18. *Conference on the Dwellings of the Labouring Classes.* ('Journal of the Society of Arts,' June, 1864.)
19. *On the Establishment and Management of Cottage Improvement Societies.* By W. A. GREENHILL, M.D. 1862.
20. *Report to the Council of the Society of Arts by the Special Committee on the Statistics of Dwellings Improvement in the Metropolis.* 1864.
21. *Sanitary Tracts.* (Published by the 'Ladies' Sanitary Association.')

WE proceed now to regard our subject from a practical and more technical point of view: to inquire what the reports and papers before us have to tell of sanitary work accomplished, what experience declares respecting the benefits accruing, what legislation on the one hand and voluntary effort on the other have done, and may be expected yet to do, in promoting public health; and lastly, to what extent and in what direction further legislation is desirable. The genius of English government forbids interference with the concerns of private individuals, except upon some grave occasion. It is most jealous of private rights. Any evil to be remedied by legislative enactment must be patent. It must, moreover, be such as the persons who are liable to be injured cannot remedy themselves, or guard against by any ordinary or reasonable carefulness of their own. On the one hand, it recognises popular ignorance as deserving protection against imposition, and poverty as worthy of defence against any tyranny of wealth. On the other hand, Parliament will never interfere in anticipation of harm which may never accrue, nor will it grant a special remedy when a private wrong can be righted speedily and readily, by poor as well as rich, on appeal to the common law of the land. Again, it is a principle of English government to appear to govern as little as possible, by leaving the people as much as may be to govern themselves, placing the correction of local evils to the greatest possible extent in the hands of local authorities selected by limited communities. And although, where sanitary questions are involved—for with these alone we are here concerned—this method of government may not be altogether free from objection on the ground of its abuse, of the prevalence of local jealousies, partialities, and prejudices, yet on the whole it must be admitted to work well. Some minor evils, indeed, may pass uncorrected; but, at all events, flagrant evils are for the most part fairly contended with. Local authorities, entrusted with sanitary powers, are guided less by professional opinions than by popular sentiment, and it is often very difficult to convince them that evils apparently trivial are in sober reality of gigantic magnitude.

The Act passed in 1855, "for the better local government of the metropolis," is based upon the principle we have been just enunciating. One of its most striking features is, that it attached to each of the small municipal bodies to whose care the sanitary management of the metropolis is committed a "medical officer of health." It is the duty of this officer, on certain occasions, to set the local authority in motion, but he is himself also invested with certain legal powers, and to some extent with a capability of independent action. It is a matter, if not of surprise, yet certainly of profound satisfaction, that the gentlemen selected to fill these offices in the metropolis have, in spite of local cabal and intrigue, been almost to a man such as either already possessed the confidence of the profession, or such as have shown themselves in the progress of time to deserve it. In reading down the list of their names we cannot fail to recognise many who are distinguished either as practical physicians, or as successful cultivators of those sciences which serve as handmaids to our art.

The first business that the medical officers of health set about was to clear away the filth which, under a less enlightened system of management, had been permitted to accumulate in and about London habitations. With this end they induced their several local boards to put into force the wholesome provisions of the Nuisances Removal Act. Happily for London, it was found that the statute might be enforced by any three members of a local board acting as a Nuisances Removal Committee; and hence it is that a vast amount of work has been accomplished without the vexatious delays and impediments inseparable from the discussion of each case in an assembly of from fifty to one hundred persons, some of whom could not fail to be interested parties. It has been calculated[1] that within five years, by the abolition of cesspools alone, an amount of dangerous filth was removed such as would, if brought together, have formed a putrescent lake many feet in depth, and extending over an area of some ten acres. This filth was pumped for the most part into the sewers, and from thence discharged into the Thames. Whether this was the best mode of disposing of it, is open to grave question, especially when the then state of the metropolitan sewers is considered; but we are not aware that any damage to public health resulted from the proceeding, probably on account of the concurrent improvements in house drainage and of flushing; whilst the fœtid odour of the Thames, thus tolerably well accounted for, effectually stimulated our senators to those amendments in the banks of the river which are now in progress.

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[1] Transactions of the National Association for the Promotion of Social Science, 1862, p. 659.

Many are the difficulties which have been encountered and overcome in the progress of this purification; many remain yet to be overcome; but the greatest impediment of all lies in the gross ignorance, prejudices, and negligence of the class for whose benefit the sanitary efforts of local authorities are principally exerted. Health officers continually complain that localities which they have succeeded in improving, when landlord and tenants are once freed from supervision, invariably and rapidly degenerate. And so they will continue to do, until the people shall be taught what they may and what they ought to do for themselves, their rights as tenants to a sweet and wholesome lodging, to the food they eat and the water they drink being supplied to them of wholesome quality, and be instructed on those points of domestic management which go, in their combination, to make up the ideal of a healthy and comfortable home. And it is on this account that we hold in high estimation as a sanitary agency the work that is now being done by societies for the promotion of temperance (notwithstanding a few extravagances), the establishment of "working men's clubs," and adult classes for elementary instruction; and, above all, the very excellent machinery set in motion by the "Ladies' Sanitary Association." We believe that the promoters of this admirable society have struck upon the very path which is most likely to lead to the permanent sanitary improvement of the labouring classes. No laws that ever were or ever shall be made can stand in the place of that large-hearted sympathy with those below us in station and inferior in educational advantages and material wealth, which we are all bound discreetly to exercise, whatever the religion we profess. Happily this duty, so long disregarded, lost sight of among the multiplying complications of our social life, is now every day becoming more generally recognised, and its recognition is being followed up by appropriate action. It cannot, indeed, be expected that the arrears arising from long negligence are to be gathered up at once, or that the will of the workers shall always be guided by that sound judgment which is so essential to all who undertake the very delicate task of attempting to guide and to advise the poor. But whatever unavoidable shortcomings there may have been, whatever errors may have been fallen into, a progressive work with so good an object cannot fail to prosper in the end. We look for great results from it, since it strikes at the root of the grand impediment with which all sanitarians have to contend. The last 'Report of the Ladies' Sanitary Association' contains a list of forty-seven little tracts upon subjects connected with public and private hygiene. Some of them contain useful summaries of the sanitary statutes, with directions as to the mode in which their benefits may be realized by the occupants of poor tenements. Some of the tracts bear the names of well-known sanitarians—as, for instance, of Dr. Druitt, Mr. Nourse, and the Rector of Eversley. It is something to be able to say of all that we have perused, that, while they are wholly free from that childish phraseology in which some very worthy people seem to think the poor can alone be intelligibly addressed, they abound in excellent advice, forcibly given, in language which, being unaffected and simple, is acceptable to all and can be offensive to none. The Association also promotes the delivery of popular lectures upon sanitary subjects. In the list of lecturers we find the names of several of the medical officers of health, of Dr. Richardson, Mr. Rendle, Professor Marshall, Mr. Pepper, and Mrs. Balfour. But perhaps the most hopeful branch of its operations is the employment of "sanitary missionaries," for which work they select women of intelligence, who are, nevertheless, not above putting their hands even to what is menial, setting to work to clean up and make tidy a poor tenement, and instructing those whom they visit in simple cookery, and in the making and repair of apparel; thus showing them what may be done for comfort and health with very ordinary materials, and introducing and fostering tastes and habits calculated to render the poor man's home more attractive than the public-house. Nor are the operations of the Association confined to the metropolis: branch associations have been formed in Aberdeen, Glasgow, Dublin, Brighton, Oxford, Bath, Reading, Paisley, and Bristol, most of which are working satisfactorily. We sincerely hope that the time is not far distant when this organization will be extended to every town and village in the United Kingdom. Until some such general diffusion of sanitary labour is effected, we must not expect to be exempt from the disheartening criticism which some writers think fit to indulge in when alluding to the results of sanitary work.

But still our "national efforts for purification" have not, as has been suggested by Mr. Sargant and others, "been a failure." They have had good results, although they may not have "realized the magnificent expectations of reducing the mortality of towns to that of the country," or "of reducing the mortality of the country to that of Grayrigg in Westmoreland, or of Calbourne in the Isle of Wight." The substitution of good for bad house and town drainage, and of pure for impure water, has had beneficial results, in spite of all that the wet-blanket class of philosophers may say in its disparagement. We are not responsible for the exaggerated anticipations of early sanitary reformers, who possibly may have laid upon this one variety of improvement more stress than it deserved, or rather, perhaps, who may have overlooked the evil influence of other equally important and concomitant conditions. If the death-rate is to be the test of results, let it be applied to places where the work of purification has been most actively carried on. Apply it to London. What does the Registrar-General say:

"If we take the two decenniads, the mortality in the first (1840-9) is at the rate of 25·16; in the second (1850-9) at the rate of 23·63 per 1000 of the population; thus showing a progressive improvement of 1·53 deaths less on 1000 living during the second decenniad. Dividing the twenty years into quinquenniads, the rates of mortality were 24·44, 25·88, 24·17, and 23·08, and in the last four years 23·44."[1]

Surely these are results, and if not more striking than they are, let it be remembered in explanation that the population of London is a very mixed and varying one, that a stream of people is pouring constantly into the metropolis from all parts of the kingdom and from abroad, and another stream as constantly pouring out of it. At the last census, out of 2,803,989 persons of all ages in London, more than a third, viz. 1,062,812, were natives of some other place; and that of the 1,617,930 persons who were over twenty years of age, as many as 866,549, or more than half, were aliens to the metropolis. Let it be remembered, too, that the reduction in death-rate, small as it appears, has taken place, notwithstanding the inevitable increase of crowding in poor localities, the consequence of demolition of dwellings for railways and metropolitan improvements. Let us then take the instance of a provincial city, where the conditions of a drainage experiment are simple, and free from the complications which render the estimation of the value of such works so difficult in London. The city of Salisbury supplies us with such an instance. About 1850 the city was placed under a Local Board of Health, and a sum of 27,000*l.* was spent in drainage and waterworks. Prior to this, the streets were traversed with open channels, or rivulets, which received much of the sewage of the city. The subsoil was wet, and the whole atmosphere moist and polluted. Since the drainage, we are told by Mr. A. B. Middleton, the channels being annihilated, the ground is dry, and dry cellars can be made. Now, before these works, the mortality of the Close of Salisbury (the cathedral precincts, occupied by the more wealthy inhabitants) was 20 in 1000 for many years; since the drainage-works, it has fallen for nine years to 13 per 1000. For nine years previous to the new drainage the births in the city were 2470, and the deaths 2226, giving a majority of 244 of births over deaths. For nine years since the works the births have been 2624, and the deaths 1695, giving a majority of 929 births over deaths. Mr. Middleton further states that the deaths from consumption for seven years before the drainage were 286, and for seven years since the drainage 143, being a decrease of just one-half.

How can it be said that works of purification have proved a failure? Let us, however, apply the test of death-rate to some smaller district still. There is in the north of London a small district of one of the parishes, through which a fœtid open drain, the Hackney Brook sewer, used to run. The population consists almost wholly of labouring people; and before the abolition of the sewer in 1860, and the subsequent draining of the district into the new north level intercepting sewer, and the improvement of all the house-drainage, every house had its cesspool. During this period of filth and foul effluvia, the sickness in the district was always great, and cases of malignant fever were commonly met with. The death-rate, too, was high. In 1860 it was 23 in a population of 1029 persons, in 1861 it fell to 19, in 1862 it fell again to 17, and in 1863 to 16. The diseases which have been observed also have been of a less asthenic type. It is proper to state that this is a district in which the Ladies' Association maintained a sanitary missionary. And then, to pass from a district such as this to the results observed in single streets. Dr. Tripe, the health-officer of Hackney, speaking in one of his reports of three streets in his parish, says that:

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[1] Weekly Returns of Births, Deaths, and Causes of Deaths in London, 1863, p. iv.

> "In 1858, when the drainage was fair (i.e., by a small private sewer), there were 13 deaths; in 1859, when the drainage was bad, 25 deaths; in 1860, when the drainage was again good, there were 14 deaths; in 1858 there was not any death from fever; in 1859 there were 5 deaths; and in 1860 only 1 death."

Surely such a statement as this does not mean that drainage is a sanitary failure. But it means something else, and that is, the tendency of improved districts to retrograde, and that such retrogression is marked by an increase of fatal sickness.

And this instance reminds us of another test which may be applied to ascertain whether improved drainage has had any beneficial result, and that test is the prevalence of typhoïd fever. Now in London, the metropolitan vestries commenced this sanitary work in 1856. Has typhoïd fever been equally prevalent since that year to what it was before? It is useless to consult the Registrar-General's summaries to ascertain this point, for he confounds all varieties of continued fever under one common title. And we may here say, by the way, that it is very much to be regretted that the national registers of births and deaths are altogether so imperfect as to throw constant impediments in the way of their use for medico-statistical purposes. To ascertain the prevalence of typhoïd, therefore, in London, we are driven to the records of the London Fever Hospital, which, at any rate, will give us an index. It appears then that, during the ten years 1848 to 1857 the annual average of admissions from this variety of fever was 182. In the next five years, the annual average of admissions fell to 140. We do not pretend to assert that this improvement is entirely due to the abolition of cesspools and to improved house-drainage, for with these amendments there has been, of late years, a very great improvement in the water-supply of the metropolis, not only more being furnished to the poor for the purposes of cleanliness and drain-flushing, but what has been furnished being of better quality, taken from purer sources, and properly filtered by the water companies. But the fact we adduce is an answer to the following, as we think, unwarranted statement of Dr. Christison,[1] and the questions which accompany it: "During the period that this scourge has been alternately growing and diminishing in London, has London become alternately worse and better drained, or have the habits of its working-classes been alternately less and more cleanly?"

It is true that we cannot controvert the assertion of this distinguished physician, which may be placed in opposition to our London experiences, that "the street-drains in the Old Town (of Edinburgh) have been much improved during the very period that enteric fevers have been increasing." But we may fairly ask what he means by street-drain improvement? Does this phrase mean that the effluvia from drains and excreta are no longer discharged into the houses of the old town, no longer contaminate the atmosphere of the wynds and closes through which they are ventilated? For really this is the all-important question. In London, while grand engineering works have been progressing at an expenditure of millions of money, the more humble, but not less important, work of purifying the dwellings of both rich and poor has been progressing also under the direction of some forty skilful medical officers of health. Has this, too, been done in the Old Town of Edinburgh?

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[1] Address on the Public Health Department, Social Science Congress, 1863.

But while we thus rebut the assertions of those who would have us believe that national works of purification have been without results, we must not regard the condition of our London drainage, and the arrangements for the removal of offensive and dangerous matter from amongst our population, with too great complacency. And first as to our system of sewage. We mean to say very little about the gigantic intercepting tunnels which the Metropolitan Board of Works have constructed to carry away—and throw away—the excreta of nearly three millions of people; for, although we cannot expect them to acknowledge it in so many words, we infer from some of their recent acts that the truth is at last dawning upon their understandings that they have committed, at a gigantic expense, a gigantic blunder; but we do mean to inquire whether the main sewers which these tunnels are constructed to intercept—our street sewers—are all that they ought to be? There can be no higher authority upon that branch of engineering which relates to sewers than Mr. Rawlinson. We will therefore quote some passages from a paper of his published three years ago in the 'Journal of the Society of Arts:'

> "Although the first formation of public sewers in the British metropolis dates so far back as 1428, by far the greater portion of the 1500 miles of the main sewers in London have been constructed since the year 1824; Mr. John Roe having had the perseverance, however, and credit of effecting more improvements in the main sewers of his districts, Holborn and Finsbury, up to the end of his period of service, than any other man. The improvement of adopting the egg-shape, in place of vertical sides, for sewers, the introduction of side entrances, and means of flushing, and the experiments carried out by Mr. Roe, and tables based on these experiments, are invaluable for the metropolis. Mr. Roe found the construction of sewers a matter of guess; he left it a matter of scientific certainty. If all the sewers of this great metropolis had been laid out and constructed on the plan proposed and adopted by Mr. Roe in his division, vast additional sums of money would have been saved, and (humanly speaking) many lives prolonged; the flat-bottomed sewers which now exist would have had semicircular channels; and the deposit which now accumulates and corrupts, would have been regularly washed out or periodically flushed out at short intervals . . . . The ventilation of sewers by vertical shafts and open grates in the centre of the streets was, no doubt, an improvement, though a very clumsy and disagreeable plan."

Still he tells us:

> "At present there is much injury effected by sewer gases passing through drains and into houses. In 1859, on the use of a disinfectant in the public sewers having a powerful odour, all the houses directly drained by these sewers were tainted, showing that there was a flow of air from the sewers to the houses. This should not be, and can only be avoided by external ventilation of each house-drain." (p. 3.)

Here are some of Mr. Rawlinson's opinions as to the proper method of constructing sewers. The plan he advocates certainly commends itself to men of common sense. We need only add that it is not the method generally in operation in London :

> "Sewers should be laid in straight lines and with regular gradients. At each alternate change in direction or alteration of gradient, a man-hole or entrance into the sewer should be constructed . . . . . . Brick sewers should be formed of radiated bricks, set in hydraulic mortar."

We know of one instance where a comparatively newly-constructed main sewer was nearly destroyed in the wet season of 1860 by the blocks of which it was constructed having been made by "grouting" the bricks with a liquid mixture of cement and gravel, in place of uniting them by cement laid on with the trowel. This came of taking a low contract to save expense. The medical officer of health where this occurred pointed out the fault, and induced his vestry to accept no future contract without providing that a similar mistake should not again be committed.

> "The inlets of all drains should be properly protected, and the openings should be reduced, so that any substance entering the drain may pass freely into the main sewer. . . . . Neither sewers nor drains should be laid under new inhabited dwellings. If it be absolutely necessary to carry a drain under a house, the drain should be carefully laid, and the joints made perfectly tight, so as to prevent the escape of sewer gases into the adjoining subsoil. . . . . Additional fall (to sewers) should be given at junctions or bends, to overcome increased friction. Junction entrances, provided for branch sewers and house drainage, should be protected by earthenware plates, or 'disc plugs.' Street gullies should be small, compact, and double-trapped. There should be a sediment box, easily removed and easily replaced. . . . . . A town standing on ground having quick gradients requires special arrangements to break the rush of water down, and of gases up. This can be done by breaking the line with a vertical fall, placing a flap over the mouth of the sewer, and ventilating at this point."

This rule would apply to certain elevated parts of the metropolitan district. How much evil might be avoided were it attended to! In fact, many of the London main sewers are still what Mr. Chadwick once called them, "elongated cesspools," and nothing more; so slow is the passage of matters through them, so trifling their scour, and so imperfectly are the great thoroughfares protected against their emanations.

> "Proper sewers and drains deliver sewage at the outfall fresh, and in this state fish are not killed, but fed. The putrid sewage flushed from the foul sewers of the metropolis during hot weather by a thunderstorm taints the

river and poisons fish; but even in the hot summer of 1859, the mortality of London was low, although the Thames was foul. As cesspools have been abolished the public health has improved; and if all the sewers were of sectional dimensions, forms, and gradients (as they may be), to transmit fresh sewage, and not retain it until putrefaction sets in, the public health would be further improved. It is practicable so to improve and manage the public sewers of this metropolis, that sewage one day old shall not remain, but shall be in motion towards some outlet; and in motion there is safety, but danger in stagnation." (p. 5.)

Then why is not this done? We do not commonly discuss engineering questions in this Review, nor should we probably have said a word about this matter now, had we not been able to entrench ourselves behind the dicta of so accomplished an engineer as Mr. Rawlinson; but this is one in which we have a concern. It is one in which the medical officers of health in the metropolis are especially concerned, and in respect of which they have a claim to be heard by their local boards. And there is another matter to which we call their attention.

Why, particularly with our present defective sewer arrangements, are not the ventilating openings in the London streets protected by charcoal? We are not without experience on the proceeding. It has been tried with good results in the City, under the direction of Dr. Letheby and Mr. Haywood, the engineer to the Corporation, and these gentlemen made a report upon the subject in 1862. They showed—first, that the deodorizing power of the charcoal has been satisfactorily proved to be complete; secondly, they are of opinion that, if the ventilators could be so arranged as to keep the charcoal dry, it would not require to be removed more than once a year, if so often; thirdly, they state that, although the currents of air through the ventilators are somewhat interfered with, yet, probably from the high diffusive power of the gases, there appears to have been no appreciable increase of foulness of the atmosphere of the sewers themselves, no complaints having been made by the workmen employed in them. Nor does it appear that the alteration in the ventilators has had the effect of increasing effluvium in the interior of dwellings. Fourthly, they tell us that the cost of each ventilator in these experiments was about 8*l.* 16*s.* 8*d.*, and the annual cost of supervision, &c., 1*l.* 5*s.* 3*d.* each; but that they are satisfied that the expense of the system might be considerably reduced. Even if it should appear that the universal application of the charcoal to ventilators is unadvisable, they are still of opinion that "the system may be generally applied with advantage."

We have already referred to a portion of the work carried out in London by the medical officers of health. Shortly after their appointment they constituted themselves into an association, which now, having been in existence about eight years, forms a sort of sanitary council for the metropolis, and a medium for united action. The formation of this society was a good omen for London, and it has by its eminently practical aims attracted to itself the most distinguished sanitary workers of the day, whose names will be found on its roll of members. Such a body as this must be listened to respectfully, and, should any emergency arise, an expression of its opinion will not fail to be of influence. During the past year it has been occupied, amongst other things, in the endeavour to obtain some amendment in the present unsatisfactory method in which the births and deaths are registered in this country. The principal points which they have pressed upon the Registrar-General are—1. The loose and unsatisfactory manner in which medical certificates of the "cause of death" are given. 2. That the registration of births should be made compulsory and imperative. 3. That the births of still-born children should be registered, as they are both in France and Austria. 4. That no death should be registered except on the production of a certificate of the cause of death from a legally qualified practitioner, or the record of the verdict of a jury signed by the coroner. And, 5. That no *sudden* death should be registered until the decision of the coroner be made known to the registrar, whether he will hold an inquest or not. Another excellent work which the Association undertook was a weekly record of the sickness of the metropolis. Mr. Rumsey has said, with much truth, that

> "Facts are accumulating to prove that the mere number of deaths occurring in any locality bears no constant or even approximative ratio to the real amount of unhealthiness existing there. As a necessary result of improvements in domestic management and medical treatment, and owing to the removal or absence of those more virulent agents of destruction which by sharp and decisive strokes prematurely sever the thread of life, its duration has been lengthened in our great cities; but at the same time, the sickly and infirm period of existence has been prolonged probably in a greater degree than even life itself. Chronic diseases, or at least functional disorders, have increased. Vital force is lowered. Man's work is arrested; his duties are unperformed; his objects fail; though he still lives. Weakly, diseased children are now mercifully helped, as they never were in olden time, to grow up into weakly, ailing adults, who, in their turn, propagate with abnormal fecundity an unsound progeny. Is this true sanitary progress? Does it deserve the ostentatious parade of a decreasing death-rate? . . . . The mere death-rate, therefore, without the life-rate of the inhabitants, may and does lead to most fallacious conclusions as to local unhealthiness." [1]

Great efforts were made by the Association to obtain a complete record of the sickness prevalent in London, and the result was promising. Government undertook the publication of the 'Returns' at the public expense, but, during a paroxysm of Parliamentary economy, the trifling grant of money for this excellent object was withdrawn, and the weekly report consequently fell to the ground. That it did so is to be deplored, for it bid fair to fill up a gap in medico-sanitary statistics which still exists. Many of the health-officers who contributed to the 'Return' still publish the sickness statistics of their own districts in their own reports, but these are necessarily wanting in any but local interest.

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[1] On Certain Deficiencies in our Public Records of Mortality and Sickness, with Suggestions for an Improved and Extended National System of Registration. Paper read at Bradford, October 12th, 1859.

We pass on now somewhat more systematically to consider the remedies in use, and those which may be proposed for certain specific sanitary evils, such as have occupied our attention in our previous article.

I. The *overcrowding* of tenements and workrooms.—The legal remedy against overcrowding is contained in the 29th section of the Nuisances Removal Act, and its enforcement is dependent upon a medical certificate to the effect that a house is "so overcrowded as to be dangerous or prejudicial to the health of the inhabitants." This certificate, then, is based upon an opinion, and the question has arisen over and over again, what amount of crowding in a house constitutes dangerous or harmful crowding? for such crowding clearly must be *over*crowding. Where an infectious fever breaks out in a house, any unprotected person occupying the same room with the patient will be endangered; and hence, in the case of a family occupying but one room (other families occupying other rooms) every member of that family is endangered. Thus, such a house would, *de facto*, be crowded so as to be dangerous. But this is clearly not the meaning of the clause, because by using the term *over*crowded, such crowding as is unavoidable in poor tenements, and is not in itself dangerous, seems to be excepted; and we are not aware that it has ever been attempted to enforce the clause upon any such interpretation. It has, however, been universally held by the metropolitan police magistrates, that a house is "overcrowded" whenever any one room in the house is overcrowded. What then, putting aside the contingency of contagious disease, constitutes "dangerous" overcrowding? This question has been answered in a variety of ways. Upon one point all agree—namely, that any amount of crowding is dangerous in which each individual occupying a room has not provided for him a sufficiency of fresh air; and that this deficiency is dangerous, first, because the vital element of the air is reduced by the occupancy, and next, and principally, because the air thus deteriorated in quality is further rendered harmful by the accumulation of animal exhalations. If *sufficient* provision be made for the removal of this deteriorated and damaged air, and the supply in its place of fresh air—that is, it sufficient "ventilation" be provided—it is difficult to see what amount of crowding could be called "dangerous overcrowding." But then, how are we to judge of the sufficiency of ventilation? The methods which make the highest pretension to scientific accuracy are the physical and the chemical methods. In a room provided with a chimney (and other rooms must, in any case, be treated exceptionally) the former method may be applied by determining the velocity of the air passing out of the room thereby, either by calculation based upon the mean temperature of the air in the chimney, that of the external air, and friction depending upon the length and diameter of the chimney, or else by experiment with the anemometer. In the latter method we have to determine the rate of motion of air in the chimney per minute, and multiply the velocity by the area of the narrower part of the chimney; this will give us the number of cubic feet of air per minute passing by this means out of the room. The determination of the quantity entering would, of course, be useful for correcting the result, but then we do not see how it could be practically or conveniently ascertained. The chemical method consists mainly in determining the quantity of carbonic acid and moisture in the atmosphere of the room after being occupied for a given time. This may be effected by means of an aspirator with the ordinary tubes for absorbing the water and carbonic acid. The valuation of the results of these two methods can only be made, first, upon the estimate adopted of the quantity of air inspired and expired by persons of different ages and sexes; and next, upon the physiological operation of carbonic acid upon the human system when mixed in certain proportions with atmospheric air. Unfortunately for both these methods, it is in the valuation that we meet with our check. The expired air being mixed with the air of the apartment, an allowance has to be made for the capacity of the apartment in judging of the change that is necessary to keep the air of the room pure. Besides, an uncertain amount of ventilation is always going on even in a closed-up room by mere "diffusion." Again, although we may assume that the respiration for many consecutive hours of air charged with as little as 1 per cent. of carbonic acid is injurious to the system, yet we do not know whether this amount of impurity is equally injurious to both sexes, and to children equally with adults; nor yet do we know to what extent habitual exposure to such an impure atmosphere leads to its toleration by the system. If we appeal to authority, we find the utmost variety of estimate as to the quantity of air that ought to be supplied for the maintenance of health. Some, as Dr. Arnott, place it as high as 20 cubic feet per minute; others, as Dr. Reed, at 10 cubic feet; while, on the other hand, Vierordt fixes 2½ cubic feet as the minimum —a supply which Dr. Arnott would have regarded as absolutely insufficient. We must not omit to mention here, as one form of the chemical method, that of Dr. Angus Smith, in which he determines the quantity of organic matter by means of a test solution of permanganate of potash. No doubt a very decided deoxidation of the solution, and still more certainly a very rapid deoxidation, would be highly suspicious; but the test is too delicate and too uncertain in its significance for daily practical use. For practical purposes we are driven, then, to the adoption of some of the empirical methods of determining the question of dangerous overcrowding, assisted and confirmed, if necessary, by one or more of the physical or chemical methods referred to.

The first of these empirical tests is the offensiveness of the apartment while occupied, or just after being vacated—the perception to an unpleasant degree of what has been called an "animal odour." But this offensiveness, resulting from an impression upon the nerves of the observer, is liable to variations depending upon his own condition, and especially upon whether he has just entered the room from the open air, or has been exposed to a similar atmosphere just previously.

Besides, in poor tenements, some of this odour might be observed even if the room were empty of inhabitants, arising from filthy clothing, bedding, carpets, &c. It has been argued by Dr. Bence Jones, that what causes the offensiveness may not be poisonous, instancing musk as an animal substance of most powerful odour, yet innocuous. But this, we suggest, is not to the point, as the test of offensiveness is only applied as an indication of general atmospheric impurity from habitation without sufficient change of air. If the depravation of the air be sufficient to produce in any instance headache, giddiness, sickness, or syncope—symptoms which are of very common occurrence, as we all know, in crowded churches, concert-rooms, &c.—there can be no question whatever of the deficiency of ventilation. The other empirical test we shall notice is that of cubic capacity. Now this has been the best abused method of determining dangerous overcrowding of any that have been proposed. Dr. Bence Jones criticises it severely, and, to a great extent, no doubt, his criticism is warrantable; but, for all that, it is the method above all others, the value of which experience has vindicated, and that which, from its ready application and elasticity—unscientific elasticity, if you please—has come to be that most commonly had recourse to by the officers of health in London, and depended upon almost more than any other by the police magistrates in their administration of the law relating to overcrowding. And the reason appears to be this, that although cubic space in a room constantly inhabited is, as Dr. Bence Jones properly says, "entirely lost in comparison with the importance of change of air or ventilation of the room," yet where the law is being applied to the tenements of the poor, in which each small room (say of 1000 cubic feet) is occupied by a family of father, mother, and children, and where the head of the family cannot afford the expense of greater accommodation, the amount of ventilation requisite to bring the atmosphere to a standard approaching even to purity would expose a poor family in winter to an amount of draught and cold that they could not tolerate, even if the proper amount of ventilation could be readily obtained. The administrators of the law have to deal with these tenancy arrangements as they find them; and if they reject an accurate and scientific method for one more lax and unscientific, it is because they are compelled to sacrifice much, very much, to expediency. Adopting, then, this method on the ground of expediency, where is the line to be drawn? Of course each case of overcrowding has to be considered to some degree on its own merits, and allowance must be made for a variety of circumstances, such as the shape and height of the room, the size, position, and arrangements of the window, the position of the door and of the fireplace, the furniture in the room, &c. But still, allowing for variation, and leaving a good margin for all these contingencies and others which we have not mentioned, a general rule may be laid down. If a man be confined for twelve hours in a close space of 640 cubic feet, and if (which is by no means certain, especially at night) he goes on excreting carbonic acid at the ordinary rate, the air at the expiration of that period will probably be contaminated with carbonic acid to the extent of about 1 per cent. But we may assume that some ventilation goes on in every occupied room by means of the chimney, doors, and windows, even when the latter are closed. The extent of this is unknown, but it must be considerable, especially when the chimney is warm; at any rate it would be sufficient, in all probability, to reduce the contamination to very much below 1 per cent., certainly to a proportion too low to warrant any one in certifying that it was dangerous or prejudicial to health. We may even go so far as to say that a room with 1000 cubic feet capacity may safely be occupied by two persons, with less safety by three. Still it is to be recollected that a room is not usually closed up for twelve consecutive hours, and the shorter the period of its closure the less the danger to health. It is on all these considerations, we presume, that the minimum standard of cubic capacity for poor tenements, usually adopted by the metropolitan officers of health, taking adults and children together, is 300 or 400 cubic feet per head, an allowance which it is quite practicable to enforce, and which the police magistrates accordingly have enforced over and over again. We may add, that the minimum of cubic space demanded in workhouse dormitories by the Poor Law Board is 300 feet.

But some of the metropolitan health officers have hesitated to interfere even to this extent. The difficulty present in the minds of such is thus expressed by the late Dr. R. D. Thomson, and the remedy for the evils of overcrowding which he suggests is, we believe, that to which the Legislature will at length be driven—namely, the licensing of houses occupied in tenements, in the same manner in which common lodging-houses are licensed at present:

> "I have been chary of recommending the removal of inhabitants from even illegal dwellings until they should be provided with new habitations without the obligation of overcrowding. The necessity for legislation in this direction is continually becoming more urgent. For where are working men and women to live?—and more particularly, what is to become of families? These are social questions which are connected with the basis of health and morality. There is a growing disinclination among owners of property to accommodate working people with families, from the liability to injury to which their property is thus subjected. And this difficulty, in the married state, of procuring lodgings must tend to throw obstacles in the way of marriage, and to add fuel to the flame of the social evil which is at present attracting so much attention in the metropolis. Even where accommodation is provided for those who are the subjects of overcrowding, there is a difficulty in proving that apartments contain more than a proper number of inhabitants; because the numerous wandering lodgers, who constitute a large portion of our population, never reach their dormitories till after midnight. Unless the houses are licensed the premises cannot be visited either by the police or the local authorities, to ascertain whether the law is obeyed or not."[1]

We have hitherto been speaking of the law as relating to poor tenements; its application to workrooms presents fewer difficulties. No pecuniary impediment need trouble us here. If an employer brings together a number of men and women for labour, we hold that he is bound not to poison them; and, if such a case came under our own cognisance, we should not hesitate for one moment in demanding all that the science of the day would warrant us in demanding. We agree with Dr. Bence Jones in such a case as this:

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[1] Seventh Annual Report of the Medical Officer of Health for Marylebone, p. 5.

> "It appears to me that, instead of taking the cubic contents of a room as the guide, the ventilation and the square contents—or in other words, the change of air and the size of the floor—can alone determine the number of persons that can safely and properly be admitted into any space." (p. 3.)

II. The subject we have just been considering naturally brings up another—namely, how a sufficiency of wholesome house accommodation for the labouring classes is to be obtained. At present we have shown that the accommodation provided is certainly not sufficient, and very often not wholesome. Let us first see what legislation has done to provide for the wholesomeness of this accommodation. We have already referred to the overcrowding clause of the Nuisances Removal Act; it has, however, other clauses under which a variety of amendments in ventilation, cleanliness, drainage, &c., may be enforced in dwellings already in occupation. We will say no more about this, except to state what is perhaps not generally known in the profession, but which it is well that every medical practitioner should know, that where local authorities refuse or neglect to enforce the Act of Vict. 18 and 19, c. cxxi., the 13th section of an amended Act—23 and 24 Vict. c. lxxvii.—empowers any inhabitant to lay a complaint of any nuisance before a magistrate, who shall then issue a summons, in the same way as if the local authority had made the complaint; he may empower a constable or other person or persons to enter premises for examination, and on the adjourned hearing may make any order for amendment that he is empowered to make under the former Act. One result of this statute appears to us to be (and of course we write here under legal correction), that any voluntary association of inhabitants established for the sanitary improvement of any district may do, with the assistance of the Bench, and inexpensively also, everything that can be done by a local authority under the statute. Then again, there are the Common Lodging-house Acts, 1851 and 1853, which, by providing that such houses shall be kept clean and wholesome, and by limiting (although not in the most satisfactory degree) the number of occupants, have done away with a great scandal and a fruitful source of contagious maladies. The strange thing about them is, that they nowhere define what a "common lodging-house" is; and this is the more strange on account of their being penal statutes. The result is that the most limited construction has been put upon the term, and a "common lodging-house" has been held to be one which takes in merely nightly lodgers. The General Board of Health, however (with what authority we know not), in a circular issued in October, 1853, direct "that the provisions of the Common Lodging-house Act shall extend to rooms occupied by members of different families, whether for weekly, monthly, quarterly, or longer periods." This letting for longer periods than a single night is one of the modes in which it has been attempted to evade the penal clauses of the Act, nor do we believe that local authorities are generally aware of this more extended interpretation.

With a view to improve the extent of accommodation, and "to encourage the establishment of well-ordered lodging-houses for the labouring classes," Parliament passed a permissive Act (14 and 15 Vict. cap. 34), under which certain local boards might provide and maintain such houses, and, should they prove not to be commercially successful, might discontinue them. But, like most "permissive" Acts, it has been little used. The only other statutes which we need notice as bearing upon this point are the Metropolitan Building Acts. In a paper upon the defects in the sanitary provisions of the Building Act, Mr. Liddle has pointed out not only how flagrantly that clause is evaded which provides for an open space for light and ventilation in the rear of houses, all the rooms of which cannot be lighted from a public way, but also a number of other matters, which in a sanitary point of view ought certainly not to have been neglected in such an Act. Thus he says:

> "Provision is not made for preventing the damp of walls, nor are rules laid down for regulating the size of windows in a house, except in those rooms which are below the surface of the footway. Neither is provision made for the ventilation of rooms. The Act also is silent upon the subject of the kind of materials to be used in the foundation of houses and for the construction of the walls. How far it is desirable to prevent the use of such rubbish as is occasionally observed in the construction of the lowest class of houses, and how far the use of such materials is injurious to the health of the occupants of a house so built, is a matter upon which, at present, I offer no opinion, but it is certainly a subject worthy of inquiry."[1]

But, after all, the practical solution of the question, "What is to be done to provide increased wholesome house accommodation for the labouring classes?" lies outside the walls of St. Stephen's. The true answer is, "By public and private enterprise." If we really mean to have it, it lies in our own power to get it; and we must set to work as hearty, self-reliant Englishmen always do, when they have once thoroughly made their minds up as to what they want. But this is a preliminary question about which we must be quite clear, What is it that we really want? First of all, we want to take the supply of house accommodation for the poor from the sordid hands which at present deal it out to them, and to place it in the hands of persons who shall be conscientiously alive to the moral responsibilities which the possession of such property involves. In this way we may anticipate amendment in the character of this low class of property. Next, we want more dwellings, provided with all necessary sanitary appliances. Philanthropy, charity—these are powerful engines in modern society, but a more powerful engine still is self-interest. But are these two classes of motive, both excellent in their way, so diametrically opposed to each other as to be incapable of combination for a common object? Let us see. This is a subject which has been a good deal discussed, and not a little experimented upon. One of the most important discussions is that which took place under the auspices of the Society of Arts in June last year; and the statistics of the experiments already made are embodied in the report of a special committee of the same society. The suggestion of Mr. Nourse, of Brighton,[1] is, "that all who can afford it, every one with means and leisure and independence, should make it a point of duty to become possessed of some freehold cottage property, to be properly managed, made to pay, and let to a decent tenantry." But then, how few are qualified to manage such property —how few would willingly undergo the vexations and disappointments which the endeavour to manage it properly would involve! That such property, well managed, may be made to pay, there is no doubt at all, as we shall show presently; and then, what a private individual may not be able or not be qualified to accomplish, may be readily accomplished by joint enterprise. Such enterprises, undertaken by societies of persons, have been successful—not invariably, for no one could expect this—but still successful under conditions which are now beginning to be understood.

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[1] The Builder, vol. xix. p. 893.

Financially two kinds of procedure have to be distinguished, one being the purchase and improvement or renovation of dwellings already existent, and the other the erection of entirely new dwellings. The former procedure has hitherto been financially most advantageous. Renovated dwellings, let to families at the rate of 1*s.* 6*d.* to 4*s.* per week for single rooms, and 4*s.* to 5*s.* for two rooms, have returned in one instance, that of Clark's-buildings, as much as 10 per cent. upon the outlay. Renovated lodging-houses for single men and women have been on the whole less successful, because of the necessity of enforcing regulations for the sake of order, which are not exactly relished by tenants, who have shown a preference for houses where no restrictions of the kind are imposed. The most practical and sensible advice that we have come across relating to this subject, is contained in a pamphlet by Dr. Greenhill of Hastings, who was one of the chief promoters of the "Hastings Cottage Improvement Society." His remarks apply only to town populations; and while he does not discourage the investment of capital in such undertakings by private individuals who possess sufficient capital for the purpose, he believes that joint-stock companies are the best calculated to accomplish the end in view,—taking care, however, that the money requisite for the scheme should be forthcoming before operations are commenced. And then Dr. Greenhill says:

> "The whole secret of the success or failure of the society will depend mainly on its management; so that, if you cannot find at least three or four persons fit to undertake the office, you had better not attempt to establish the society at all. It would, perhaps, be a delicate and invidious task to attempt to define what is meant by a *competent* person; but there is one danger to which a society of this kind is especially exposed, and which therefore re-

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[1] The Sanitary Duties of Private Individuals. Tract published by the Ladies' Sanitary Association.

quires to be especially pointed out. As the undertaking is essentially philanthropic, at least in one of its aspects, it is sometimes thought (or perhaps, rather, taken for granted) that a sincere desire to benefit the poor by making their homes comfortable is all that is required in the director of a Cottage Improvement Society. But to this very important (nay, even indispensable) qualification must be added a considerable amount of sound judgment and some other intellectual gifts besides, or the society will hardly meet with much success.

"It is generally found easier by the directors to do their duty to the tenants than to the shareholders; at least there has probably been no instance in which the tenants of a Cottage Improvement Society have not been much better off than those of an ordinary landlord. Indeed, the common temptation of the directors of such a society is to do for the tenants rather too much than too little, and to give them expensive comforts and conveniences which they are as yet quite unable to appreciate. The work of elevating the tastes and habits of the poorer classes must be attempted very gradually, or the landlord will be liable to constant disappointments, which might have been avoided by a different course of proceeding." (p. 8.)

Another piece of practical advice we cannot refrain from quoting:

"In the same way it will be better to let the first purchase of property be small, or of moderate size; if blunders are made, they will be less expensive to the society; and when you have learned to manage thoroughly a small property, you will be better fitted to undertake a large one. Again, if you determine to begin by renovating old property, it will be better not to increase your difficulties (which will always at the outset, even under the most favourable circumstances, be quite enough) by making your first experiment with a block of houses so ruinous as to require an unusual amount of expensive repairs, or situate in such a neighbourhood that you cannot get respectable people to take them, while you will not suffer the existing tenants to remain. This advice may at first appear to be not only selfish, but also almost unintelligible; for 'is not the physical and moral purification of such a block of houses the very object for which the society has been established?' Certainly it is, but not of *this* block only; and it is in order that the society may have the opportunity of doing away with the physical and moral filth of *many* of such blocks of houses hereafter that the above advice has been given. If you cannot pay your shareholders a fair dividend, you will find it difficult to increase your capital; and if you are not able to increase your capital, your sphere of usefulness will be limited to one single block of houses, instead of spreading over the whole district." (p. 12.)

By careful purchase—for the primary outlay in purchase and repairs very greatly influences the financial success—renovated property ought to pay four and a half per cent. In illustration of the principles of management which have been found most successful, we may refer to two societies, the half-yearly reports of which are now lying before us. Both are conducted very much in the same way, and both have had the benefit of the fostering care of Dr. Greenhill. The Hastings Cottage Improvement Society is the earlier of the two. It originated with some half-dozen gentlemen who desired to attempt the improvement of the moral and sanitary condition of some of the worst courts in the oldest part of Hastings. It began with a capital of only 850*l.*, with which a court consisting of nine freehold cottages was purchased. In October last year it appears from the fifteenth half-yearly report of the society that the capital of the society amounted to 17,000*l.*, that it possessed 165 houses, some of them newly erected, and that it had paid to its shareholders an annual dividend of 5*l.* per cent. clear of income tax, during the whole period of seven and a half years. Some points in the method of management we must particularly mention :—1. The establishment of a reserve fund, being 1 per cent. upon the capital stock, in order to provide against unforeseen losses, depreciation of property, or extraordinary expenses. 2. A careful selection of tenants, none being taken whose character would not bear investigation. 3. The establishment of a benevolent fund for the assistance of the tenants in times of distress, by loans or otherwise. 4. The appointment of visitors to visit the houses, and thus to ascertain the wants and wishes of the tenants, and to maintain a friendly feeling between them and the society. 5. The payment of rent *in advance*, by which means bad debts have been avoided to a marvellous extent, 6 or 7 per cent. of the gross revenue being the utmost loss in any year. The benevolent fund has proved very serviceable by rendering tenants loth to quit the houses, and thus enabling the collector to be more strict in getting in the rents. Latterly, the society has been incorporated under the "Companies Act," and has adopted a system of "self-insurance," by which the Government duty is saved. The insurance and reserve funds together at the time of the last report amounted to 220*l.*

The other society is established in London, "The London Labourers' Dwellings Society." It commenced operations at the beginning of 1861, with a capital of 3400*l.* in thirty-four 100*l.* shares fully paid up, some of the original shareholders being shareholders in the Hastings society. The first purchases were made in St. George's-in-the-East, consisting of twenty-six houses, and some other premises in Old Gravel-lane, Calvert-street, and York-place. The sixth half-yearly report tells us that in June last year the capital of the society—i.e., after only three years' existence, amounted to 7700*l.*; it possessed seventy-six houses, and the net income has been annually 6·03 per cent. on the paid-up capital, out of which the members have received dividends at the rate of 5 per cent. clear of income tax, the remainder having been added to the reserve fund. Some of the property being leasehold, a "sinking" or "redemption fund" had to be established. There is a benevolent fund also, as in the case of the Hastings society. The same careful selection of tenants is made, and yet we are told that there is never any difficulty experienced in keeping the houses tenanted by respectable people. It is well to observe, however, for the benefit of future imitators, that it was found that the cost of "çonveyance" of property in London was about three times greater than in the provincial society. The reserve fund at the last account amounted to 1140*l.*, and the sinking fund to 1499*l.*, these sums being invested in the society's shares. This society also is now incorporated under the "Companies' Act."

The erection of new dwellings—model buildings—with accommodation for families, and of model lodging-houses for single men, has been less remunerative to those who have undertaken it. Some persons indeed, as Miss Burdett Coutts, have looked less for financial results than to be pioneers in an important philanthropic work. The buildings erected by this lady in Columbia-square only pay 2¼ per cent., but then, although the site was cheap, the construction has been upon an expensive plan, and such as to subject the buildings to heavy rates, which might have been avoided had the "external gallery system" been adopted; and besides, the buildings include many advantages to the tenants which benevolence could offer as a boon, but speculation could not expect to profit by. Other erections, however, have paid from 8 per cent. for suburban dwellings, to as little as 1⅐ per cent. for urban dwellings. And now one word about the "external gallery" plan of construction for model buildings. Its great advantage is, that the judges have pronounced that, in a block of building, each tenement so approached and let at a rent below the rateable amount is a "separate house" with regard to taxation. It is this which, in addition to its advantages for health and convenience, has rendered this plan of building a favourite one.

A great part of the discussion which took place at the Conference in the rooms of the Society of Arts was devoted to considering in what way the Legislature might fairly be asked to facilitate the erection of proper and sufficient dwellings for the labouring classes. We think, too, that some facilities might fairly be expected by those who, at their own risk, undertake to provide for this great public want. But before we state the results of the discussion, we must refer to one or two suggestions which arose in the course of it. One of these was made by the chairman, Mr. W. Hawes, and was to the effect that money might probably be obtained on loan through the Public Works Commissioners at a low rate of interest, in the same manner as it is advanced to landed proprietors for drainage and other improvements. It would, as he pointed out, be simply borrowing from the national fund to increase the national resources; and he pointed out that, if by lessening sickness and improving the condition of the labouring classes we thereby increase the number of days available to each man for profitable employment, we add materially to the national wealth, which would amount to many percentages upon the value of the loans, and make it nationally a very advantageous employment of capital. He further expressed his belief that this was the only way in which we could secure the erection of a sufficient number of houses in large towns. But while we agree with Mr. Hawes, we cannot agree with the design of another suggestion put forward at the Conference. Mr. Thomas Hare considers that something might be done by the application and extension of Lord Westbury's Registration of Titles Act, to enable the better class of labourers to become absolute possessors of those portions of buildings thus constructed which they themselves occupy. The objection to facilitating such a process is, that the difficulty we experience now in enforcing cleanliness and preventing overcrowding and immorality would, as Dr. Greenhill points out, be immensely increased if each house became the absolute property of its tenant, who would of course allow no interference with an Englishman's rights over his own "castle." However, a different view was taken by the Conference, which adopted the following resolution:

> "That the Legislature can promote the erection of proper and sufficient dwellings for the labouring classes:
>
> "1. By loans at low rates of interest, repayable within a limited time, and under proper security and conditions for building dwellings and cottages upon the precedent of the Dwellings of Labouring Classes, Ireland, Act, 1860 (23 Vict. c. 19), and other similar Acts of the Legislature.
>
> "2. By assimilating the law of this country with that of Ireland and Scotland (Tenure and Improvement of Land, Ireland, Act, 1860, 23 and 24 Vict. c. 153, Act for Facilitating the Building of Labourers' Cottages, 1860), in giving facilities for obtaining advances on the security of settled estates.
>
> "3. By throwing upon public companies requiring houses inhabited by the labouring classes, for their own commercial purposes, the obligation of erecting an equal number to those destroyed.
>
> "4. By improvement of the Lodging-house Act, as regards provision for sanitary purposes, and giving greater power to inspecting officers.
>
> "5. By giving facilities to owners of property, under disabilities (such as tenants for life, minors, &c.), for conveying sites for building cottages, upon the principle of the Montgomery Act in Scotland (10 Geo. III. c. 31), and the Tenure and Improvement of Land in Ireland (23 and 24 Vict. c. 153).
>
> "6. By cheapening the cost of title and transfer of property, so far as affects cottage property.
>
> "7. By enabling cottage property and labourers' houses in towns, and the sites of such property, to be registered under local authorities as personal property, transferable, as to local registry alone, in the same manner as Government stocks and railway shares.
>
> "8. By abolishing the law of settlement, and extending the present limited area of assessment for local taxation, so as to equalize the payments of all classes."

In so many directions does this dwelling-house question ramify!

III. One can scarcely take up any annual report of a medical officer of health without finding some complaint about the supply of water to poor dwellings in the metropolis. The Metropolis Water Act, indeed, empowers local boards to require a supply to be given to each house; and on the landlord refusing compliance, to lay it on themselves and recover the expenses. But then a double difficulty arises: in the first place, there are many houses in which the space is so small that there is no room for the placing of a tank; in the next place, when a tank is erected in a court so as to be common to several houses, it is no rare occurrence to find the water run out before the day has closed, in consequence of the wasteful habits of the population. Besides, under the latter arrangement it almost constantly happens that unless water is preserved in the houses on Saturdays there is none to be had at all on Sundays. There are other objections to the tank system, on the ground of cleanliness and the practice of placing the tanks above common privies for the convenience of flushing them. So serious is this difficulty, that the subject was brought by Mr. Liddle under the notice of the Association of Medical Officers of Health. The conclusion which they arrived at was, that in poor and densely-populated neighbourhoods the plan of supplying water for domestic use by cisterns ought to be abolished, and a constant supply obtained from the mains of the water companies. The objection to this on the part of some companies, and especially of the New River Company, has been, that the waste would be great, while the water thus given to one court or number of houses would be liable to be stolen for the supply of others. As to the stealing, it may at once be replied, that no one would steal water that did not want it, and the fact of its being stolen would be sufficient evidence that the supply to the depredators was insufficient. On any such case becoming known to the local authority there is power to give a supply; so that thus the company would rather be benefited than the reverse; and the waste on this system would, we are convinced, be less than on the tank system, if, as has been proposed, each supply were furnished by some such "waste-preventing apparatus" as that of Messrs. Jennings or of Messrs. Guest and Grimes. In that part of Whitechapel which is supplied by the East London Water Company, we are informed that the latter apparatus has been put up. Mr. Wicksteed, the former engineer of this company, in his evidence before the "Commissioners for Inquiring into the State of Large Towns and Populous Districts," states that "the best mode of supplying water to the poor would be by a common stand-cock so constructed that when water was required it would be necessary to hold up the valve to keep it open, and when the supply was obtained the valve would shut itself and remain closed until water was again required." The forms of apparatus we have referred to only supply, we believe, a gallon at a time, and then a short interval must elapse before another gallon can be obtained. Sanitary progress is not to be arrested by want of enlightenment on the part of the directors of public companies holding such monopolies as do water companies. Should they persist in resolutely opposing necessary improvements, it will become the duty of the metropolitan vestries to bring their influence to bear upon Parliament, and thus to compel them to do that in the interest of the poor which, in their blind perversity, they will not do in the interest of their own shareholders.

IV. The laws relating to the prevention of disease are as yet in a condition far from satisfactory. This, too, is a subject which has, during the past year, been under discussion in the Association of Health Officers, who, while proposing some amendments in the Nuisances Removal Act, suggest that there should be incorporated into it some of the provisions of the Diseases Prevention Act. Since the last-named Act was passed, new sanitary boards, provided with a responsible medical adviser, have sprung into existence, and some of the powers vested now in the Privy Council might, with great benefit to the public, be transferred to them. At the present time, on the local outbreak of an epidemic disease, powers which it is most important that local authorities should possess for the speedy interment of the dead, the establishment of house-to-house visitation, the provision of hospital accommodation for the sick, and the adoption of innumerable other measures for arresting the spread of disease, can only be obtained by application to the Privy Council. This body, however, being under the necessity of publishing its order in the 'Gazette,' is very reluctant to put the Act into operation on account of the dread of panic; and hence its advantages are practically lost to the public, except when some such general pestilence as cholera invades the entire country. If this roundabout proceeding could be altered in the way suggested, there would be no difficulty, we imagine, in providing against the unnecessary exercise of their powers by local authorities, while all dread of panic would be set aside by the quiet mode in which the Act would be put in force.

There are one or two other difficulties which the metropolitan health officers have to contend with, in which we think there should be some parliamentary assistance. One of these is the want of all regulation respecting the dead up to the period of their burial. Now this is one of the hardships of the poor, who having often but one room, are compelled to keep their dead in that room together with the living until the means for burial are forthcoming. That disease is often spread in this way there can be no reasonable doubt. Every district should be compelled to provide for its inhabitants a decent dead-house, such as all classes might be willing to make use of. There could be no difficulty, we imagine, in providing against the chance of a body deposited therein being left to be buried at the public expense, for it is well known that none but the very indigent will accept of a parish funeral; all have a praiseworthy repugnance to it, and the few cases of the kind that might arise would not be worthy of being put into the scale against the public advantages of removal of the dead from crowded houses. It is also worthy of consideration whether some compulsory powers of removal should not be granted to local authorities. Interference with the dead must always be a delicate matter; but there are times when private rights and feelings must give way to the public interest, and no interference of the sort should ever take place except on a certificate from a medical officer of health or some qualified medical practitioner. The Metropolitan Association of Health Officers are desirous, also, of promoting the habitual use of charcoal where bodies are retained for any time within inhabited houses. The practice would become habitual if undertakers could be induced to take up this important subject, and provide themselves with a sufficient number of appropriate charcoal screens or covers, which they might lend as temporary lids. Dr. Barnes suggests, that if bodies removed from hospitals to private dwellings were previously surrounded by charcoal, the observance of the precaution would act as a great encouragement to the general adoption of similar means amongst the public. Another matter, in respect to which some legal enactment is very much needed, is the exposure in the public streets, and the conveyance in public carriages, of persons suffering from contagious diseases, such as small-pox, fever, &c. Public exposure of a person thus suffering is at present an indictable offence.[1] A magistrate, on application for it, may grant a summons against the offender, and make it returnable at the sessions. Some more summary process is desirable. But there is not even this remedy, so far as we can gather, against the dangerous practice, which in London is followed almost habitually, of conveying patients to hospitals in the public cabs. It will be recollected, also, that some little time ago a schoolboy with scarlet fever was conveyed in a first-class carriage of a railway. Public attention has, over and over again, been called to this practice, but the attempt at legislation failed. The failure appears to have been due to an endeavour to include too much in the Bill. It might, we imagine, be sufficient to enact that a penalty shall lie against any person who knowingly conveyed, or permitted to be conveyed, in a public carriage, a person whom there are reasonable grounds for believing to be sick, to any hospital devoted to the reception of persons suffering from small-pox or fever. Although such an enactment would not altogether do away with the danger to which the public are now exposed, it would get rid of a great deal of it. Parishes, too, should be required to keep proper carriages for such purposes. Some of the London parishes do so now; they are empowered to incur the expense, if they think fit, under the 23rd and 24th Vict., c. 77, sect. 12.

But although Parliament might fairly be asked to improve our laws relating to the prevention of disease, there is still a good deal that may and ought to be done in other quarters. We are speaking now of contagious diseases; and the first thing that occurs to us is the custom of our great metropolitan hospitals of refusing to admit such cases into their wards. Of course, cases of infectious fevers could not be mingled with ordinary cases of disease, but it is worth an inquiry whether the noble establishments we refer to are altogether fulfilling the objects of their foundation, so long as no portion of their princely endowments is devoted to the arrest of disease amongst the poor in their immediate neighbourhood. We have never been able to comprehend why, in each of these hospitals, a ward is not set aside for the reception of such cases. If, as we believe, the separation of the sick from the healthy is the chief means of checking the spread of small-pox, scarlet-fever, &c., the existence of such accommodation in our hospitals would be an inestimable boon to London. The unusual spread of small-pox in London two years ago was greatly favoured by the necessity of retaining isolated cases at home as soon as the Small-pox Hospital was full. No other hospital would receive them; parish authorities were naturally fearful of devoting workhouse premises to their reception; and houses for temporary hospitals could not be had, as soon as it was known to what use they were about to be applied. The Manchester and Salford Sanitary Association suggest that it might be expedient, in times of epidemic prevalence of disease, to encourage the establishment, in various quarters of a town, of self-supporting institutions, into which, on the payment of a weekly fee, the children of artisans and such persons among the middle classes as might desire to avail themselves of their benefits, might obtain admission. Another very important precautionary measure lies in the hands of school managers. How often is the spread of exanthematous fevers among the children in a poor neighbourhood traced to the district school, into which children have been permitted to come, if not themselves infected, yet from infected families or houses! We do not say that this danger is altogether avoidable, but we do say that it might be greatly lessened by a little careful inquiry whenever a child is found absent from school on account of sickness. There is another precaution which should be taken, and this is applicable to all large schools: it is that no child should be admitted which has not undergone a satisfactory vaccination. An investigation made into this matter by Drs. Seaton and Buchanan showed that 53 in every 1000 children in the national and parochial schools in London exhibited on their arms no scars of vaccination whatever. The danger to which such children are exposed in the schools, and to which they expose others, is seen in the fact that more than a third of these children were scarred with small-pox. The excuse which has been made to us by clergymen and school directors, when we have urged upon them the adoption of such a rule, is, that the attempt to enforce it would affect their schools injuriously by deterring parents from sending their children. We see at once how far this deterrent operation of the rule would extend—namely, to one in each twenty who may apply, or thereabouts; and it appears to us that the judicious application of the rule would result in showing parents that an inconvenience resulted from disobedience to the law in respect to vaccination, while an opportunity would be given for a few words of friendly advice. Dr. Lankester has shown, by holding inquests in cases of death from small-pox, how his office may be made available in directing the public mind to sanitary deficiencies and the laws relating to vaccination. In his First Annual Report he says:

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[1] Burn's Justice, vol. v. p. 236.

> "The functions of the coroner's court are of great importance in relation to these diseases, as many of them are contagious, or arise from circumstances over which man has most distinct control. By early inquiries before the coroners' juries into causes of unnatural death, the progress of pestilence may not unfrequently be stayed. In many cases the law requires the removal of nuisances injurious to health, and where notice is served for the removal of these nuisances, and they have not been removed and are the cause of death, there can be little doubt that parties so offending expose themselves to verdicts of manslaughter in coroners' courts. When the neglect is not criminal, it becomes of the highest importance to the community that the existence of causes of disease amongst them should be made known."

We ourselves know of one instance where nothing short of the public exposure and the damnatory verdict of a coroner's jury sufficed to induce the owner of some low property to amend conditions which were fostering disease.

V. The inquiries instituted, under the direction of Mr. Simon, into the mode of conducting trades and manufactures injurious to the workpeople have elicited the fact, that even in those trades which are naturally unwholesome the injurious influence they exert is more or less controllable. Thus he says:

> "It deserves notice, that the extreme subdivision of labour, which marks our highly artificial system of manufacturing industry, is specially apt to illustrate the hurtfulness of particular industrial processes. Where only some small part of a manufacturing process is directly hurtful in its nature, the hurtfulness of that part might easily escape observation, or, indeed, might practically be of little importance, if every workman in the factory took his turn of it, as of other parts of the manufacture, and thus had for his share but a small exposure to the influences. But under our existing organization of labour, the china-scourer is always a china-scourer, the flax-hackler always flax-hackler, the steel-grinder always steel-grinder; and thus the evil effect of the occupation goes on accumulating in the individual."[1]

Again:

> "Working with an arsenical pigment might not cause any appreciable injury to health, if it formed only a small part of the worker's total occupation. A manufacturer, properly organizing his business, ought of course to secure this result."[2]

In trades only contingently and not necessarily unwholesome, probably much more might be effected; as, for instance, in china-scouring, potteries, the carding room of cotton factories, flax factories, and so on, by arrangements for carrying off dust, and for obviating the disturbance of any that may be deposited. The dread of expense is the only bar to improvement in these and other similar trades. Mr. Simon enumerates three sources from which a reform could be initiated—the voluntary action of employers of labour, the demands and insistence of the workpeople, and the coercion of the law. About each of these he has something to say:

> "First, as regards employers of labour, they in many instances have given ample proof of good-will; in every one of the injurious occupations, different establishments present different degrees of injuriousness; and in those establishments where the better conditions exist, the superiority denotes that means of improvement have been voluntarily adopted by enlightened and kind-hearted employers. On the other hand, in many instances the employer seems not to have given any thought whatever to the matter—seems to be unconscious of any particular responsibility in regard to it—seems not to know, or for practical purposes not to care, that he makes his commercial profits with an unjust and wasteful consumption of his neighbour's life. Again, in a considerable number of intermediate cases, the employer has attempted to mitigate the unwholesome influences under which his workpeople are suffering, and has failed through want of knowledge, as especially in the many unskilful endeavours which have been made to amend the ventilation of workrooms.
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> "Secondly, as regards the workpeople themselves, it is true that in a certain sense the matter is in their hands—that they might rebel against needlessly unwholesome conditions of labour—might refuse to work in places where there is not reasonable care for their lives. But this theoretical power of the workman is in present practice a nullity. He cannot exact his sanitary rights. He could not do so unless he were one in a combination of claimants; nor even then unless, further, he had sufficient knowledge to shape demands for definite

[1] Fourth Report, p. 27.

[2] Fifth Report, p. 13.

remedies. . . . . Even where the mischief is most flagrant, the workman sometimes has a short-sighted hesitation about the remedy—is apprehensive lest, if his occupation were made harmless to him, his weekly wages would be made smaller; and especially he is jealous of new introductions of machinery, which in some cases might supersede hurtful processes of hand labour. Then, too, the progress of disease is slow—phthisis . . . . is so insidious, and the beginning artisan young and careless, and death far in the distance."[1]

Then as respects coercion by the law: Mr. Simon points out that, now, defects of ventilation, theoretically dealt with by the Nuisances Removal Act, are practically not dealt with at all,—first, on account of the magnitude of the evil to be remedied being on all hands not sufficiently appreciated, and secondly, on account of the want of that amount of intelligence and discrimination necessary to be applied in prescribing suitable ventilation for a workplace. He draws attention to a clause in the Nuisances Removal Act which gives a remedy in those cases where "effluvia" from a manufactory or business annoy persons in the neighbourhood, and he asks what reason there is why industrial establishments, in their relation to the health of persons labouring in them, should not be made subject to the spirit of this enactment? He suggests that Government inspection (for which there is a precedent in the case of certain factories) should be extended to those whose life is endangered by the occupation, and that the Government inspector should have power over common sanitary faults, as well as over the special faults which it is now his business to see after, and that he should be authorized to move justices to order amendments of ventilation as well as the proper boxing of machinery. One contribution towards carrying out Mr. Simon's views was made last session by the passing of the Factory Acts Extension Act. It applies only to the following employments—viz., the manufacture of earthenware (except bricks and tiles), of lucifer-matches, of percussion caps, and of cartridges, the employment of paper-staining, and the employment of fustian-cutting. Its leading provisions are directed to cleanliness and ventilation, so as to render harmless, as far as is practicable, any gases, dust, or other impurities generated in the process of manufacture; to give power to the occupier of any factory to make special regulations for compelling his workmen to observe the conditions necessary to ensure these ends; and lastly, to the limitation of age and hours of work, and to preventing meals being taken in the rooms where the manufacturing processes, especially lucifer-match making, are carried on.

The "Bakehouses Regulation Act, 1863," is another statute passed in the interests of workmen. It is applicable to the whole kingdom, and may be applied by local authorities in any district with a population of more than 5000 persons. It provides for the visitation of bakehouses during the hours of work, and for their cleanliness. It prohibits the employment at night of persons under eighteen years of age, and also the use of any rooms not properly separated from the bakehouse and properly ventilated as a sleeping place. This last prohibition has been interpreted by the magistrates to include the bakehouse itself, and is evidently an attempt to do away altogether by a side wind with the wretched system of night-work. That the trade may be effectually carried on without it, is sufficiently proved by the evidence gathered together by Mr. Tremenheere. There has appeared, however, from some cause or another, some reluctance on the part of local authorities to enforce the statute. Islington is, we believe, the only metropolitan parish which has instituted any legal proceedings under the Act.

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[1] Fourth Report, p. 27.

The case of the milliners and dressmakers has been taken up by the Ladies' Sanitary Association, who, "in order to test the public desire that the work of the milliners and dressmakers of the west end of London should be carried on under conditions which will not impair the health and endanger the lives of the workers," have themselves established a "Dressmaking Company," which they propose shall be a model establishment, so far as its sanitary arrangements go, and through the agency of which they hope to be able to reform those habits on the part of customers which have led to the necessity of overwork.

VI. Two Bills were introduced into Parliament last session by the Government, proposing to lay restrictions upon the trade in diseased cattle,—one the "Cattle and Meat Importation" Bill, the other the "Cattle Diseases Prevention" Bill. Both were referred to a Select Committee, who, after examining a large number of persons who exhibited all that delightful want of unanimity which is customary on such occasions, determined to recommend the abandonment of the former Bill, and suggested a variety of alterations in the latter. The Cattle Diseases Prevention Bill will, it is hoped, be seriously taken up next session. Its principal provisions, as modified by the Select Committee, were, to impose a penalty upon persons exposing diseased cattle where other cattle might be contaminated; to empower the Privy Council to make special regulations as to the examination, removal, destruction, &c. of diseased cattle; to provide for the cleanliness of trucks, &c., and for the appointment of local cattle inspectors, with power to remove diseased cattle from any market or fair. Additional clauses were proposed by the committee, one respecting the establishment of a market for cattle affected with certain diseases, and another to prohibit the feeding of swine upon uncooked flesh. Mr. Gamgee is of opinion that piggeries ought to be entirely suppressed in large towns, and in this we quite agree with him, not on account of the mode in which pigs are fed there, (for we think that they would still get the same kind of food sent to them from the towns, while less control could be exercised in the country,) but because large piggeries are invariably a great nuisance when established in the neighbourhood of human dwellings.

A great part of the inquiries of the committee related to the inspection of slaughter-houses; and it was held pretty generally that this could only be made thoroughly effectual in large towns by confining the slaughtering to public abattoirs, to the total exclusion of private slaughter-houses. We are disposed to hold a similar opinion, but still are not disposed to think that private slaughter-houses should be altogether abolished. In the summer time, indeed, such a prohibition would not only prove a great hardship to butchers, but would introduce a more serious evil than that which it is proposed to obviate, inasmuch as meat often becomes tainted within an hour, or even less, when carried in a cart for a mile or so in hot weather. This appears to be especially the case with mutton and lamb; and hence we should ourselves place no obstacle in the way of butchers killing sheep, at all events, at home during the summer months. A second question which arose related to the sort of persons who ought to be appointed as inspectors. Of course, the butchers who gave their evidence were in favour of persons of their own trade; and all the evidence went to show that butchers know perfectly well when they see a diseased animal that it is diseased, and are capable of detecting even pleuro-pneumonia in any stage, except in those few instances where latency masks it, as it does sometimes disease in the human subject. But then, their sympathies will naturally be with their *confrères;* and in those cases where scientific knowledge is of importance, as in the detection of trichinous pork, they would be quite inefficient. The meat inspector at Leeds, who is a butcher by trade, stated that he judged of the unfitness of the meat for human food, not from the fact of the meat being that from a diseased beast, since he was in the habit of passing three out of every four carcases of pleuro-pneumonic cattle, but from the obvious changes which had taken place in the flesh as the result of the continuance of the malady, and that he only condemned the meat in the more advanced stages of the disease. If it is a fact that meat is only injurious when it is "wet" and lean, then this is a sufficient test; but if, on the other hand, the febrile disturbance in the system of the animal is that which indicates unfitness, more precise discrimination between carcases exposed for sale ought to be made. It appears from a table published in this report, that the mortality in England from carbuncle, which prior to 1842 (the date of free importation of cattle, and of the commencement of pleuro-pneumonia as an epizootic among our beasts) was only 10 per 100,000 of the deaths from all causes, rose during the years 1847–51 to 26, and during the years 1852–56 to 62 per 100,000, and since then has been 54 per 100,000. If these two things are connected (and there seems to be some connexion), then again one would be disposed to say that the inspection should, as Professor Gamgee recommends, be in the hands of persons who have undergone some scientific training, and are capable of giving some better protection to the consumer. The regulations in force in several of the Continental States, as appended to the report of the committee, are especially valuable, not only as indications of the views held upon this subject generally abroad, but as indicating what regulations it is practicable to enforce. In Austria healthy beasts alone are permitted to be slaughtered, and there is a sufficient number of sworn inspectors, who must be present during the slaughtering: when a dispute arises the case is referred to the local tribunals. Public flayors are not permitted to keep pigs. All meat brought in ready killed or from abroad must be accompanied by a certificate of *internal* soundness. In Bavaria twelve hours' notice must be given before slaughtering to the cattle and meat inspectors, who are selected in preference from among the veterinary surgeons, and who must examine all animals both before and after slaughtering. The inspector distinguishes three classes of meat; all condemned meat is destroyed, but it remains with the inspector to determine whether any part may be used for technical purposes. In Berlin a police inspector of markets examines all meat exposed for sale, and the slaughtering is confined to a "slaughterer's district," where a slaughterer is appointed, with power to seize all carcases which are unfit for food. In the canton of Berne (Switzerland) slaughtering is allowed in licensed places, as well as in public slaughter-houses. An inspector examines all animals before they are killed, and all meat is "certified;" disputes are settled by reference to two veterinary experts. Over-driven cattle are not allowed to be killed. The inspectors of slaughter-houses are veterinary surgeons, and it is their business to see that not only no diseased meat is sold, but also that none is salted or smoked, or made into sausages. The following diseases are held to render the meat of an animal more or less unfit for food. Among epizootic and contagious diseases—carbuncle, the cattle plague, gangrenous pneumonia, the hoof disease, erysipelatous fever, glanders among *horses*, dysentery, parasitic diseases of horned cattle, and hydrophobia. Among sporadic maladies—all species of dropsy, all inflammations which result in gangrene, cancerous and foul ulcers, tubercular softenings of the lungs and liver, false leprosy of horned cattle, true leprosy of pigs and cutaneous erysipelas, blennorrhœa of the vagina of cows, jaundice, poisoning of every kind, and consumption. Nevertheless, if, after having destroyed the parts affected by the disease, the other parts are sound and wholesome, they can be sold in the following cases, after having been examined and carefully considered by two licensed veterinary surgeons, viz.: Gangrenous pneumonia, softenings of the lungs and liver, slight inflammation, false leprosy, and blennorrhœa of cows. In Florence a municipal veterinary surgeon resides in the public slaughter-house, and no animal is slaughtered until he has examined it; and all diseased meat is buried. Meat is divided into three classes, viz.: 1. Meat of the first quality, from animals in a perfectly healthy condition. 2. Meat of animals not in a sound or normal condition, but fit for food; and 3. Meat not fit for food, as from animals in a high state of disease. The inspector puts a distinctive seal upon each of the first two classes. Milk from diseased animals, especially from those with foot and mouth disease, is forbidden to be sold, as also is milk which shows signs of containing pus. No private slaughtering is permitted, and animals brought in dead must have their skins on and the viscera unremoved, so that they may be fairly inspected. In Brussels, also, private slaughtering is forbidden, and there are sworn inspectors and a veterinary surgeon to examine all animals and meat. Slaughterers also must give notice to the inspectors of any disease they may discover. Similar regulations are in force in Paris, where all private slaughtering has been abolished since 1810. Some of these restrictions might well be introduced into our practice in this country, although some of them are scarcely applicable to us. The present inspection, especially in the suburbs of London, is so imperfect as to be almost equivalent to none at all, the duty not being performed by persons specially devoted to it, but devolving upon the inspectors of nuisances or health officers, whenever they have time or inclination to take the matter up. Still the slaughter-houses of the metropolis, requiring an annual license, are in some degree under supervision, and licenses have been refused on the ground of slaughter-houses having been habitually used for the killing of diseased animals. Dr. Althaus suggests that there should be special slaughter-houses for pigs, and that no pig-meat should be sold that has not been subjected to microscopical examination; but it is certain that no such restriction will ever be imposed by Parliament. Then there are the knackeries: diseased beasts must be slaughtered somewhere, and these appear to be the proper places for the purpose. This then being agreed upon, it should be rendered penal to remove any part of an animal slaughtered in a knackery to any market or shop for sale as human food: the fact of its being killed in such a place being received as absolute proof of unfitness. Moreover, we see no good reason why a salutary regulation of this kind should not be extended over the whole kingdom.

But while we must look to Parliament for the means of checking the spread of contagious diseases among cattle and the sale of diseased meat, the lessening of other kinds of disease must depend upon the diffusion of sanitary knowledge amongst farmers and owners of stock. Mr. Gamgee, holding that pleuro-pneumonia spreads mainly by contagion (a point, by the way, disputed by some and only held loosely by others), recommends dairymen to purchase only in places where the disease is absent, and to put new purchases into a sort of quarantine before allowing them to mix with the rest of the stock. He also recommends the practice of inoculation. Upon the efficacy of this also there is much difference of opinion, some maintaining that the matter introduced is of no consequence, as no specific disease is developed, and that the operation only acts by way of a derivant, much in the same way as a seton would. On the other hand, Mr. Gamgee's statistics seem to favour his views; and, like all other medical questions, this point is one which must be decided upon empirical grounds—it can never be settled by *à priori* reasoning. At a meeting of London cowkeepers which Mr. Gamgee called together a year or two ago, and which we attended, he stated very clearly his panacea for the extinction of pleuro-pneumonia in the metropolitan dairies. Careful buying and inoculation on the outbreak of disease were a part of his recommendation; but there was another, to which we must allude. He recommended cowkeepers to unite in engaging the services of a number of skilled veterinary surgeons, who should inspect their stock at short intervals, and who should be empowered by them to remove at once any animal that exhibited evidence of being diseased even in the premonitory stage, and to have it slaughtered for consumption. So far as this he would legalize the sale of pleuro-pneumonic meat. He holds, according to his evidence before the Special Committee, that such meat is not unfit for food in the incubation stage, and asserts that the disease can be diagnosed by auscultation in that stage. We should have thought that when auscultation could discover it, the disease had been developed; at any rate, that it had passed the stage of "incubation." When asked in the Committee how, he would distinguish pleuro-pneumonia in this very early stage from other diseases, he replied that it was easily done. "If there are any symptoms whatever, and the animal is at all unwell, if you move that animal you immediately hear a distinct grunt; it may be very slight, but if you put your ear to the trachea there is a slight grunt, and that grunt indicates the nature of the disease. Couple that with the history of the case and your diagnosis is complete, and without great efforts at auscultation even." (p. 19.) But allowing all this—and the harmlessness of the flesh in a very early stage of the disease—we doubt very much whether the suggestion of Mr. Gamgee could ever be carried out. We have less faith than Professor Gamgee appears to have in the *bona fides* of the parties who would be most concerned in the execution of such a scheme, involving as it would a voluntary acceptance of a certain present loss and expense in exchange for a promised future, but less certain advantage. The spread of the foot and mouth disease may be checked in dairies by care in making purchases and in management of the stock. Mr. Gamgee says:

> "In the first place, if they do not go to market that is the great secret. In Edinburgh the people avoid the market. I know several dairymen who have kept clear of the foot and mouth disease by going to the railway-station, and getting them (the cows) before they touched the market; they take them home, and put them by themselves; they see that those animals are milked last, that the person who milks the newly-bought animal does not afterwards go and milk the rest, and that the person washes his hands afterwards. There was a singular case occurred with a large stock of Ayrshire cattle, in Perthshire, belonging to the late Duke of Athole: he took his stock from Battersea Park; he never had any such thing with his stock; and the dairymaids washed their hands every time after milking each animal. The disease was kept from the udders. The animals passed through it very mildly indeed, a number never took it, and, in fact, we checked the thing. You can obtain evidence from London dairymen to the effect that they can, to a great extent, mitigate their losses by simple cleanliness and proper care, and the same can be done everywhere else."[1]

The importance of attending to these precautions is not only that they tend to preserve the health of the cows, but that when the disease attacks the udder, the discharges necessarily become mingled with the milk, and if the milk thus contaminated be drunk while fresh, and especially while warm, a disease is produced in the person that consumes it, marked by an aphthous affection of the mouth and an eruption upon the hands, with febrile disturbances of the system generally. Some continental observers—as Hertwig of Berlin, and Jacob of Basle—have established this by experiment upon their own persons; and several of those who gave their evidence before the committee—as Mr. Gamgee, Mr. Burge, the Medical Officer of Health for Fulham, Dr. Letheby, and Mr. Simon, expressed their belief that such a communication of disease sometimes occurs in this country. Dr. Letheby stated that he had seen an outbreak of "thrush," and traced the milk supplied to a certain cowhouse, where he found the animals suffering from foot and mouth disease, and the udder affected with it, and that he had no doubt in his own mind that this was the cause. Mr. Gamgee relates a case where the evidence of communication was very complete, because the person whose child was affected owned the cow, and the medical man saw that she suffered from this disease. The danger, however, is reduced considerably in London by the fact that the milk is not supplied usually in by any means a very fresh condition. As regards the flesh of animals thus affected, there appears no evidence to show clearly that it is unfit for human consumption. Most of the witnesses before the Commission held that it was a readily curable disease, and that no impediment ought to be thrown in the way of admitting beasts thus affected into the fat meat markets. The question of admitting them into store markets, however, is very different. The prevention of ovine small-pox will consist in the careful avoidance of contagion from sheep, men, dogs, or conveyances, the early slaughter and destruction of the sheep first attacked, and inoculation. Vaccination has been experimented on, but cannot be relied upon as a preventive, as the vaccine disease is only imperfectly developed in sheep. When, however, the disease is imparted artificially by inoculation, as is the case with human small-pox, a mild form of disease is developed, and one which is much less fatal than the natural disease, and far less likely to spread by contagion than a natural confluent case. According to Professor Simonds, the fatality is reduced by inoculation from 40 or even 75 per cent. of those affected to 4, or even 2 per cent.

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[1] Report of Select Committee, p. 15.

The "Act for Preventing the Adulteration of Articles of Food or Drink," passed in 1860, being a permissive act, has failed in its direct object, although it must be allowed that some moral influence has been exerted by the knowledge that the persons who wilfully adulterate food are liable to punishment. In a few of the London parishes the local boards have appointed analysts; in many instances we believe the medical officer of health has been nominated to the office without remuneration. The cause of the failure is not the lack of occasion for the services of the food analyst, but that the purchaser of an adulterated article is constituted the complainant. It might have been anticipated that very few persons would be disposed to incur the odium of prosecuting a tradesman under the statute. Besides, with the exception of those articles which are adulterated with substances whose use is prejudicial to health, a retail tradesman may always protect himself by declining to give a warranty of purity of the article he sells; and in the case of poisonous adulteration, a guilty knowledge of the adulteration, and of its dangerous character, must be established before the penalties of the statute could be enforced. It has been suggested in various quarters that, in any amendment of the statute, it should be made one of the duties of local authorities to make purchases and institute prosecutions, and no doubt this would be an improvement; but at the same time, so far as public health is concerned, we regard further legislation upon the matter altogether as of very little importance. Parliament is always impatient of sanitary Bills; and we think it would be unwise to run the risk of failure upon so comparatively trifling a subject when other more serious deficiencies in the law have to be supplied. It is sufficient that any one who feels aggrieved may obtain a hearing before the justices.

REVIEW II.

Statistical Report of the Health of the Navy for the Year 1861. (Ordered by the House of Commons to be Printed.) 8vo. pp. 254.

IN our last number we directed attention to the most recent Annual Reports of the Medical Department of the Army, and expressed our sense of the high value, increasing from year to year, of these admirable records of the health of the army at home and abroad. Hitherto physicians in civil life have not made themselves sufficiently acquainted with their contents, from a vague idea that the relations of military medicine are too special and distinctive to have a claim on the study of all professional men. The sooner that this idea is dissipated the better it will be for the advancement of sound knowledge on many of the most important problems of the healing art, as well as of public hygiène, under all circumstances and everywhere. Nor is the consideration of the health-returns of the sister service of less interest and instruction to our common profession than of those of the army. No medical men have better—few so good—opportunities of advantageously studying the etiology of many diseases, and the agency or influence of surrounding circumstances and conditions on their development and spread among a crowded, although limited, population, than the surgeons of our ships-of-war; nor is it hazarding too much to say that, if these opportunities be systematically and perseveringly turned to the best account by minute accuracy of observation and logical precision of argument, these gentlemen can do more than perhaps any other members of the profession to throw light upon, and possibly to solve, various questions that continue to agitate and perplex the medical world, and the determination of which is not less important to the civil practitioner than to the officers of the public service.

The present report appears under a new editorial superintendence. Since Dr. Bryson's well-merited elevation to the Directorship of the Medical Department of the Navy, the task which he had for many years so ably performed has been committed to Dr. A. E. Mackay, than whom no better choice could have been made by the Admiralty.

He is well known to be one of the most enlightened and efficient officers in the service. This is the sixth return since the example was first set by Dr. Bryson of issuing yearly reports of the health of the navy, in place of the former very faulty plan of occasional issues at long intervals; unfortunately, it is for no more recent date than for 1861. It is to be hoped that, ere long, an arrangement will be made to bring down the returns to a later period, so that, at all events, the navy may not continue to be in arrear of the army by a full twelvemonth, as it is at present. There cannot surely be any good reason for such delay, with the facilities now existing for rapid and regular transmission from every part of the world. In another respect the example of the army might be followed with great benefit—viz., in appending a few of the more valuable reports *in extenso* of the medical officers, more especially when there has been a serious outbreak of any epidemic disease, or when one or more ships of a squadron have been signally and unusually sickly, whether the causes thereof were satisfactorily discovered or not. In the present return, as well as in the preceding one, larger extracts from the journals of the medical officers have been given than formerly, and with marked advantage to the general instructiveness of the details. We trust to see the practice carried out more fully; the officers would thereby be stimulated to still greater earnestness in drawing up their reports, and medical science would be correspondingly benefited. Ampler details, too, from the records of the naval hospitals are also much to be desired, particularly when there has been much sickness in the port.

Among the questions of general interest which the experience of the navy may greatly elucidate, not the least important is that relating to the generation or development, and the growth or spread, of idiopathic fevers—ever a fruitful theme of professional discussion.

As the report in hand furnishes some interesting details illustrative of this subject, we shall make it the main topic of our notice on the present occasion.

On the Home station, the *Britannia*, the training-ship in Portsmouth harbour, has for several years past been the seat of occasional outbreaks of fever of a typhoïd type, and especially among the young naval cadets on board. Of 22 cases, 14 were sent to Haslar Hospital, where 3 proved fatal; 9 of these patients were cadets and 5 were seamen. Two-thirds of the attacks occurred between October and March; and it is remarked that fever of the same sort was invariably prevalent among the population of Gosport and Portsmouth at the time when the ship was most affected. Some of the ships lying close to the *Britannia* were comparatively exempt, while others were less fortunate—the *Asia*, for example, in which no fewer than three out of nine cases were fatal. No particulars, it is to be regretted, are given to account for such a high rate of mortality; nor is any satisfactory explanation offered as to the persistent liability of the *Britannia* to attacks of fever for several successive years past. It is maintained that it cannot be ascribed to any cause within the ship. Can the statement of her surgeon, "that there is as little sickness amongst these boys (the naval cadets) as there is amongst a like number elsewhere," be accepted? We should think not; but ample details are needed to form a just opinion of the whole matter, and the case evidently calls for a thorough examination with the view of putting a stop to the recurrent illness on board.

In the Mediterranean, the fever that usually occurred in the fleet was either of a remittent or of a typhoïd type, according to the locality where it was contracted. On the malarial coasts of Syria, Asia Minor, and Greece, the former was generally the character of the prevailing disease; while at Naples, Valetta, Palermo, and the ports of other large mephitic cities, the latter, either pure and simple or blended with the remittent type, was often very common. Both forms of fever become more frequent and severe with the advance of summer and early autumn. Naples was one of the most febrific places on the station: "the town was in an unhealthy condition, and strangers in particular suffered from febrile attacks." The *Amphion* suffered a good deal at Palermo, owing, as the surgeon believed, to the position of the ship behind the Mole, where the atmosphere, particularly at night, was tainted with sewer gases. The *Neptune* contracted typhoïd fever in April at Malta, and the *Racoon* at Gibraltar in June; in both places, the disease was prevalent on shore at the time. As cases occurred in the latter ship among men who had not been out of their ship, and continued to take place for long after she had gone to sea, "there is reason to believe that it was propagated by infection." Of all the Mediterranean squadron, the *St. Jean d'Acre* (to whose extreme unhealthiness in the former year special allusion was made in this journal for last April) was again the most infested with fever. "The number of attacks in that vessel are in excess of any other, and the deaths—with the exception of the *Neptune*, in which they were the same—are also more numerous." In a hygienic point of view, the history of this ship is one of the most painfully instructive on record; for three successive years, she was seldom free from some form or another of pythogenic or foul-air disease. That the extreme crowding of the men in the unventilated lower deck at night had very much to do with her excessive sickliness can scarcely, we think, be doubted; notwithstanding that it is remarked—not, we hope, as casting any doubt on this explanation—that "the proportionate space, and the mode of berthing the crew, were the same as they had been before, and *nearly* the same as in the other line-of-battle ships on the station; but more than all, they were the same as had been common in the service from time immemorial." With such a case before us, all must agree that it is surely high time that some change be made in the berthing arrangements of the crews at night, if sickness is to be prevented, and the effective strength of crews is to be maintained. In many of the ships the attacks of fever were followed by severe rheumatism, affecting especially the sciatic nerves and the articulations of the pelvic bones, and causing intense suffering and lameness. The resemblance of these cases to the "Dengue" or "break-bone fever" of the West Indies is pointedly alluded to in several of the reports.

The following remarks by Dr. Mackay, on the general question as to the alleged connexion between "foul holds" and the fevers in the Mediterranean fleet, ought to be noted by the medical officers of the service, if only to stir up among them a more thorough and searching investigation of the very important practical question therein involved; for as long as such ambiguities and uncertainties prevail, but little progress can be looked for in sound ætiological research:

> "Whether either the typhoïd or remitting fever arises from foul holds, as is sometimes supposed, may be doubted; for, although foul holds and fever may sometimes be found to be coexistent, yet the contrary is frequently the case—that is, there are ships that have been foul for years without the occurrence of fever, while there have been others with clean holds from which fever has seldom been absent. *But, after all, there appears to be no fixed idea of what constitutes a foul hold,* capable of generating special diseases according to undeterminate times and circumstances. Some regard chips of wood, shavings, and bilge water, as highly detrimental to health, while others affirm that these materials, and others which accumulate to a greater or less extent in all sea-going ships, have little or no effect on health; neither do they, under any circumstances, ever generate a specific form of epidemic disease."

That the effluvia from all decaying organic substances are liable, under certain concurrent conditions, to be mischievous to health, and to favour the development of various diseases, cannot, we imagine, be doubted by any medical man; and nowhere can more striking proofs be found than in the records of naval medicine. Of these conditions, by far the most potent is the co-existence of an atmosphere contaminated by the congregation of human beings in a confined space, without the freest ventilation, throughout the twenty-four hours. The influence of this co-operating element should never be lost sight of in estimating the possible effects of any other injurious agency on board ship, for it is never entirely wanting even in the best-conditioned vessel of war. What might not produce mischief in the open air, may act as a poison in a close, impure atmosphere. An elevated temperature will, of course, add to the power of the mischief; and so also will certain meteorological conditions, especially a moist and stagnant state of the air.

Passing from the Mediterranean, we now invite the reader to follow us to the remotest colony of the empire—that of British Columbia on the western sea-board of America—and examine with us an outbreak of what seems to have been typhoïd fever in two ships of the Pacific squadron stationed there.

The *Bacchante* lay in Esquimault Harbour, Vancouver's Island, in lat. 50°, from June to October 9th, when she left for Valparaiso, which she reached on December 6th. The first case of fever occurred on June 20th in a midshipman; it was somewhat of a remittent type, and yielded readily to treatment. On the 1st and 2nd July three midshipmen were attacked; the two in whom the symptoms were most severe were sent on shore. Then there was a case on the 17th in a seaman, who was sent next day on shore, where he died on the

27th from "typhoïd pneumonia and pulmonary apoplexy." Another young officer sickened on the 22nd, and another seaman on the 1st of August. The symptoms in the latter were at first only those of catarrhal fever; from this he was recovering, when unexpectedly a bad change took place, and the case put on all the symptoms of pure typhoïd; he ultimately recovered. On Sept. 13th a seaman was attacked with fever of an adynamic type, and on the 24th a midshipman sickened. His case was followed by one on October 4th in an engineer: "the symptoms were of a low character; there was bleeding from the mouth, gums, &c., and much diarrhœa." After the ship had left Esquimault there was a succession of cases: 2 on the 16th, 1 on the 19th, 20th, and 25th. In one patient there was repeated epistaxis, and hæmorrhage from the mouth and palate; and another, after a relapse of the fever, was suddenly seized with symptoms of peritoneal effusion, indicating perforation of the intestines. In November 6 fresh cases occurred, 4 in seamen and 2 in young officers; the attacks were now less grave than formerly, and the recoveries less tedious. In December there were 4 cases—1 on the 6th, 2 on the 7th, and 1 on the 10th.

Of these 26 cases, 2 of which were fatal, 11 occurred among the young officers of the gun-room—certainly a very large proportion, and indubitably indicating the influence either of a marked predisposition in them to the malady, or of a specially active febrific agency in that part of the ship occupied by them.

The *Topaze* arrived at Esquimault from Callao on Sept. 20th, remarkably healthy. A single case of fever of a "gastric type," with obstinate vomiting and great irritability of the bowels, having a tedious convalescence, and one of "choleraic collapse," fatal, had occurred during the voyage. On Oct. 7th, concurrently with a good many attacks of influenza, a case of fever occurred; and as the symptoms were severe, the patient was sent to the hospital on shore. This was followed by others on the 18th, 21st, 23rd, 25th, 27th, and 29th, and on the 9th and 10th Oct. But besides these 9 severe cases—3 proved fatal after twenty, twenty-three, and thirty-three days' illness—there were a good many other milder cases, which were classed under the head of "influenza," although they evidently partook of the same type as the more decided cases of fever. Eight of the severe cases occurred among the midshipmen and others living in the steerage.

That the fever in these ships was of a typhoïd or enteric type is distinctly stated by the medical officers. Many of the slighter attacks would generally be regarded as cases of febricula, influenza, or mild rheumatism; and not unfrequently the cases which eventually proved the most serious commenced in this way, so that the utmost vigilance was necessary in watching their progress. Dr. Turnbull, of the *Topaze*, in an able report, thus describes the symptoms:

"Commencing as influenza in most cases, they soon developed themselves into continued fever; in some, head symptoms predominating, 'typhus;' The majority of cases, however, were accompanied by intestinal symptoms, 'typhoïd;' in others, the two affections appeared to be combined, the diarrhœa and rose-coloured rash of typhoïd being accompanied by delirium and the other peculiar symptoms of typhus; the cases giving rise to great doubts as to the possibility of, in all instances, distinguishing the one affection from the other by the rash or the pea-soup stools—in fact, to their being two perfectly distinct fevers."

And now as to the probable cause or causes of the origin of the fever, and of its spread and continuance in these vessels, more especially among the midshipmen and in a particular part of both ships, the steerage. The medical officers were, as is too often the case, anything but agreed in their views on these important matters. Whether any instances of a similar fever had occurred among the residents on shore, was not distinctly ascertained—a point always of prime moment to determine under such circumstances. Some affirmed, and others denied it. No very distinct or palpable cause of pythogenic or febrific mischief was discovered in the *Bacchante*, although her surgeon suspected this at first; and the *Topaze* is stated to have been quite free from all offensiveness. Twice were the midshipmen of the former removed from their quarters and made to live on the main deck for a time, in order that these might be thoroughly cleared out and purified; but without putting an effectual stop to the attacks. Whether, and to what extent, the fever once developed became contagious, is a point on which also there was some difference of opinion. One thing is certain, as Dr. Mackay remarks—and the remark will apply to the *generation* as well as to the *spread* of many fevers—that "there could not possibly be conditions better fitted for the spread of disease of a limited communicable character than were afforded by the localities, in which this fever made its appearance in the *Bacchante* and *Topaze*. The gun-rooms of these ships are mere narrow berths or mess-places in the steerage, the light and air being admitted by scuttles in the ship's side, and by the doors which open on the steerage. *In this mess-place are crowded, it may be, from fifteen to twenty young officers, who sit literally shoulder to shoulder.* . . . . So long as they remained together, no cleansing of the mess-place or of the steerage could have any effect in removing the disease."

One naturally asks, can no better arrangement be found on board our ships of war than such a condition of things as this represents? and how can health be expected to be maintained, or disease prevented, if growing youths are made to breathe the stifling atmosphere of such a place? As to the excessive number of the midshipmen who were attacked, be it remembered, too, that typhoïd fever is mainly a disease of early life; more than half the cases usually occurring between fifteen and twenty-five years of age, and a considerable number under fifteen years. This may serve, in part, to account for the prevalence of fever specially among the young cadets in the *Britannia* at Portsmouth. Such being the fact, it is obvious that the utmost attention should always be paid to the airiness of the quarters where the youths are berthed on board ship, and this more than ever when any tendency to typhoïd or enteric disease is observed.

That the extreme overcrowding in the gun-room had to do in the predisposing to, and in favouring, the development of the fever in the *Bacchante* and *Topaze* is, we think, beyond doubt. The immunity of the senior officers in the ward-room is all but proof positive on this head.

We come now to by far the most serious part of the fever history of the year—namely, the prevalence, with most deadly results, of yellow fever in several of the ships of the West India squadron. Of 319 cases no fewer than 141 were fatal, and of this terrible mortality considerably more than half occurred in two ships, the *Firebrand* and the *Spiteful*. Some details respecting the former, which was the first ship attacked, and which suffered most severely, will be necessary for the following out of the narrative.

The *Firebrand*, a paddle-steamer, arrived on the station in January, and was chiefly employed between Carthagena and St. Martha, on the Spanish Main, and Jamaica, during the next five months. In April and May, while at Carthagena, several cases of remittent and intermittent fever occurred; on the 30th of the latter month, one of the remittent cases proved fatal on the sixth day of the seizure. The attacks became more frequent and severe during the next three weeks. She left Carthagena on the 3rd of June, reached Port Royal on the 7th, stayed there till the 13th, and then returned to Carthagena, where she arrived on the 17th. "Up to this date," says the surgeon, "the fever was only the common remittent, but in the majority of cases it was very severe, and during that night two assumed the yellow type." Next morning the ship left for Jamaica, which she reached on the 21st. During the passage, 12 cases of the yellow type, and 6 deaths occurred. No fewer than 38 sick with fever were at once sent to the hospital at Port Royal, and next day she sailed for Halifax, where she did not arrive till the 4th July. During these twelve days that she was at sea, the number of fresh attacks of fever—yellow, remittent, and ephemeral—amounted to 89; ten deaths had occurred on the passage, and 79 were on the sick list, all fever cases, on reaching Halifax. "The scene which presented itself," says Dr. Slayter, the health-officer of the port, on boarding her, "was very distressing; many of the sick were *in articulo mortis*. The atmosphere of the between-deck was impure, the port-holes having been closed in consequence of stormy weather. The attendants were exhausted from constant watching."[1] After landing the crew, the disease speedily subsided; 13 fresh cases, the last was on the 16th, occurred at Halifax. The total number of deaths, out of a crew of 180, was 52, and nearly all within the space of a month!—one of the most disastrous outbreaks on record.

The *Spiteful*, which had been cruising to and from different points in the Mexican Gulf since April, was in good health when she arrived from Jamaica at Havannah on the 17th of July. The harbour there was then intolerably offensive; the accumulated filth of the town is discharged into it, and the water is always nearly stagnant, especially about the depôt where the steamers have to coal. (The same thing is the case at St. Thomas, which of late years has been so notoriously unhealthy.) Yellow fever prevailed on shore at the time. On the 23rd, a stoker sickened with fever, which rapidly assumed the yellow type; and on the 25th, two other similar cases occurred. Next day she left for Nassau, which she reached on the 31st, and there she stayed till the 9th of August, and then sailed for Halifax, having sent on shore most of her sick; for the fever had continued to prevail on board ever since leaving Havannah, but the details are not given. During the seven days' passage from the Bahamas to Halifax, no fewer than 11 deaths occurred; and on her arrival there, 46 of the crew were down with the fever, 2 of them moribund. Most of the sick were sent to the *Pyramus* hospital hulk, and the rest of the crew were accommodated in a loft in the dockyard. A few cases only occurred afterwards. In all, 89 were attacked, and 37 died, out of a crew of 170, and this within six or seven weeks at most.

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[1] Transactions of the Epidemiological Society, vol. i. p. 354.

Three other ships of the squadron seem to have contracted the fever in the poisonous atmosphere around the foul coaling depôt in Havannah harbour, about the same time—the usual commencement of the sickly season—as the *Spiteful*. All of them, after longer or shorter intervals, were sent off to the northward, in hopes of promptly getting rid of the fever. The *Jason* lost 19 men out of 80 attacked; 10 of the deaths occurred on the voyage from the Mexican coast to Halifax. The *Racer* lost 20 out of 61 attacked; 7 deaths and 19 fresh cases occurred between Nassau and Halifax. Previous to this outbreak, this ship, which had been two years on the station, was singularly healthy. In the *Barracouta*, the mortality to the attacked was enormous; of 11 cases, 6, it is stated, proved fatal. No particulars are, however, mentioned.

With respect to the probable origin of the fever in the *Firebrand*, the information given is unfortunately very meagre. The surgeon says that he had no doubt that "the disease was caused by malarious emanations from the neighbourhood of Carthagena." This seems to imply that it was at first considered by him as the ordinary endemic fever of the place, and that it subsequently lapsed into the malignant type on board, as the season advanced, and the health of the crew degenerated. Whether there was any yellow fever in Carthagena at the time of the ship being there, was unfortunately not distinctly ascertained; the surgeon was informed that there had not been any cases on shore. Dr. Mackay seems to doubt this, and maintains that the fever was "brought on board," and afterwards "spread by infection among the ship's company, according to their different degrees of susceptibility." But does not this postulate rest upon hypothetical grounds only? and is it unreasonable, in the absence of any evidence of the direct introduction on board of any recognised case of the fever, to explain the development of the disease in the *Firebrand* in the same way that the late Dr. McWilliam interpreted its occurrence in the *Eclair*—viz., by the endemic fever of the African coast becoming gradually of a more aggravated type on board as summer advanced, during a very sickly season, and in an ill-constructed and unwholesome vessel, until it acquired the deadly virulence of malignant yellow fever?"[1] That, when once developed, the exhalations from the sick in the impure atmosphere of the crowded and badly-ventilated between-decks served to spread the disease, and render it more fatal, is but too apparent from the history of the disease in both ships.

That the *Spiteful*, and the other infected ships, contracted the fever while lying in the foul harbour of Havannah seems beyond doubt. The general belief of the surgeons, as well as of the commanding officers of the ships, in their special reports on the subject to the admiral on the station—an example which we trust will be followed on all such occasions in future—appears to be that the attacks of the disease were due to exposure to the horribly-polluted atmosphere in the place, infected as it was with the fever at the time, but without any traceable communication with any sick persons on shore.[2] Those of the crews who had been most on shore suffered most frequently; the attacks were not, however, confined to these individuals, as several occurred among men who had never been out of their ships while they lay in the harbour.

The case of the *Jason* deserves a special notice. She had been anything but healthy, owing mainly, in her captain's opinion, to her being a very wet ship in rainy weather, so that the men on watch had never a dry spot on the upper deck to rest on, and also to her being infested with a stench in the after-part, so offensive at times that the officers had to run on deck to avoid it. While at Halifax, a quantity of filthy mud was removed from her bilges, and additional hatches were cut in her decks to improve her ventilation. She left again on the 15th of November for the West Indies, and, when about half way between Bermuda and the Bahamas, two cases of typhoïd fever occurred; both proved fatal. Subsequently, other seven of the crew were attacked with fever of a typhoïd or of a remittent character. The attacks multiplied during the spring months, and towards the end of March one or two of the patients died with black vomit, while the ship was off Vera Cruz. She returned to Halifax in consequence. Before decided yellow fever manifested itself, the health of the crew had for some time been unsatisfactory. There was observable a tendency to low fever in many of the cases of common catarrh, as well as of diarrhœa and dyspepsia, placed on the list. The very same tendency had been observed the previous year before the outbreak of the yellow fever on board.[1] This antecedence of more than ordinary sickliness, prior to the occurrence of malignant hæmagastric fever in ships, has been repeatedly noticed. It is obviously a fact of the greatest significance in the history of the disease, alike as regards its ætiology and its prophylaxis, and the means best fitted for its general prevention or arrest.

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[1] "Many medical men," remarks the surgeon of the *Sharpshooter*, "in Jamaica with whom I have conversed on the subject, assured me that they have seen cases of what is known as Grey Town fever degenerate into yellow fever."—"Report of the Navy for 1860," p. 86.

[2] The same view seems to have been taken by the medical officers of the admiral's ship, the *Nile*, who were called upon by him to report as to the probable causes of the origin and spread of the fever in the infected vessels of the fleet. "There is no positive evidence that the disease was introduced into any of the vessels by direct contagion. It apparently arose from exposure to that combination of endemic causes which originated the disease in the particular locality at the time. Once having attacked a ship, its continuance and spread may be attributed to its localization, without the necessity in every instance of inferring direct contagion, although the cases of the *Firebrand* and the *Spiteful*, in which every attendant on the sick, with (we believe) only one exception, took the fever, may appear to favour the latter view."

What are these means?—and how far, and with what results, have they been adopted and carried out in the navy of recent years? The experience of both the public services, in the present century, has repeatedly shown that one means, and one means only, will succeed—viz., prompt removal from the immediate locality where the fever prevails, and the freest aëration in a pure atmosphere of all who have been exposed to its influence, whether they be already sick, or are merely predisposed to and threatened with the disease. In the epidemics at Gibraltar, the troops camped out on the Neutral Ground escaped, although only two or three miles distant from the town where the fever was raging, and with which the communication all the time was uninterrupted. The recent reports of the army furnish numerous similar examples, and the experience of the navy abounds with many proofs of the same sort. Whenever the crew of an infected ship have been landed, and put into wholesome airy apartments in a healthy spot, the fever has always been arrested among them more or less promptly, according to their condition at the time. This result has been repeatedly observed at Port Royal, Bermuda, and other places. Now, the same principles should obviously be adopted in dealing with a sickly or a threatened ship while she is at sea, and before she has an opportunity of reaching a port. The men should be removed, as much as possible, from the lower deck, which is of course always the closest and worst ventilated, and dispersed on the upper deck or decks, with the freest ventilation around them at all times, and especially during the night, so that the air is never allowed to be stagnant in any part of the ship. No apprehension of their catching cold or any other malady, from exposure to weather, should ever be allowed to stand in the way of this indispensable precaution. Anything is better than keeping them in the poisoned atmosphere of unventilated between-decks, and this too at that season of the year when yellow fever is invariably the most virulent—viz., from July to October.[2]

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[1] Dr. Slayter, loc. cit.

[2] The practice of sending healthy white men on board an infected ship, upon her arrival in port, cannot be too severely condemned. The results in the case of the *Icarus* at Port Royal, in 1860, were most disastrous; and now we meet with the very same thing being done in the case of the *Firebrand* at the same place. "On our return to Port Royal on the 7th June, nine hands were sent on board, none of whom had been exposed to malaria at Carthagena, yet only one of these men escaped. All the nurses were attacked."

The chief defect we have found in the accounts, in the Reports of the Navy, of the many deadly outbreaks of the fever of late years in our ships of war is that no notice, or only the very slightest, is taken of the measures which were adopted on board to arrest or mitigate its progress, prior to their arrival in port. It would add greatly to the value of the record, were fuller information given on this point in future. If the sanitary condition of the infected ships and their crews be generally such as was the case in the *Firebrand* on her arrival at Halifax, no one will wonder at the great mortality and extension of the disease which occurred during the lengthened voyage from the West Indies in many of them. Indeed, so frequent and disastrous has this result been during the last ten or twelve years, that serious doubts have been entertained as to the wisdom of the plan of sending off a vessel, whenever the fever appears on board, from the Mexican Gulf to Halifax with the view of arresting its progress, unless at the same time measures be taken on board to render her less pestilential while she is at sea. Nothing will compensate for neglect of this primary and most essential duty.

There is another point in the prophylaxis of yellow fever that calls for a few words in a notice of the medical reports of the navy—viz., its relations to the subject of quarantine. Dr. Mackay refers to "the necessity of placing all ports known to be infected in strict quarantine, as regards our inter-tropical and other possessions, in which the necessary conditions exist for keeping alive this most fatal disease when once introduced into them;" and mention is occasionally made of ships and hospitals being put and kept in "strict quarantine." Exception will doubtless be taken by many to the unqualified recommendation of such a practice, and experience may be appealed to as anything but favourable to the views which the medical department of the service has advocated, of recent years, in connexion with it. Many controversies in science—and in no branch more than in medicine—have, it is well known, arisen and are perpetuated by the use of loose and ill-defined terms and phrases; and so it may be in the present instance. In popular language, the term "quarantine" is often used to denote merely the partial or incomplete segregation of an infected object, person, or place, and the avoiding of all unnecessary communication or intercourse with the same. But technically and actually it signifies very much more, and it involves consequences of far wider application, and more serious import than the above simple and very reasonable precaution. In medical writings, of course, the technical and correct meaning should only be used. One of the consequences—our limits forbid giving further details—was illustrated in one of the ships mentioned in the present report, the *Barracouta*, when she was prevented from landing any of her sick crew at the naval hospital at Bermuda, and was obliged to proceed on her voyage to England notwithstanding the remonstrances of her captain and surgeon. It was to have been hoped that after the just condemnation of such a barbarous practice, in the case of H.M.S. *Eclair* on her arrival at Portsmouth fifteen years before, it would not have been renewed, and seemingly without disapproval at Somerset House. The case serves to show how needful it is, for many reasons, that a searching inquiry should be made into all the circumstances connected with the disastrous prevalence of yellow fever in our ships of war, of recent years, on the West Indian and other stations. The welfare of the seaman and the interests of the public alike call for it. In the official investigation which, it is understood, has been instituted by the War Office respecting the late calamitous outbreak at Bermuda, when both services sustained such heavy losses, the points we have specially alluded to well deserve the most careful examination.

REVIEW III.

1. *Entozoa: an Introduction to the Study of Helminthology, with reference more particularly to the Internal Parasites of Man.* By J. SPENCER COBBOLD, M.D., F.R.S., Lecturer on Comparative Anatomy at the Middlesex Hospital.—*London*, 1864. pp. 480.
2. *On Poisoning by Diseased Pork: being an Essay on Trichinosis or Flesh-worm Disease; its Prevention and Cure.* By JULIUS ALTHAUS, M.D., M.R.C.P. Lond., Physician to the Royal Infirmary for Diseases of the Chest.—*London*, 1864. pp. 34.
3. *On Domestic Animals in Health and Disease.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.—*Edinburgh*, 1862-4.
4. *The Edinburgh Veterinary Review and Annals of Comparative Pathology.*—*Edinburgh.* Vols. I.—VI. 1859-64.

THERE are three classes of persons who are especially concerned in the subject-matter of Dr. Cobbold's book — the zoologist, the political economist, and the physician, with whom we may place the sanitarian. Of course, whatever concerns the two latter classes of inquirers concerns also the general public. Without any further preface, then, we will proceed, taking Dr. Cobbold's excellent work as the basis of our remarks, to discuss the subject of entozoa from the standing-place from which each of these three classes of persons would view it; not following, therefore, the precise order adopted by the author, but one which for our purpose is more convenient. But, first, let us pay a tribute of respect to another class of observers in whose libraries this book must of necessity find a place. We mean the gentlemen who are engaged in the special practice of veterinary medicine. The cow-leech of our younger days, ignorant, quackish, and conceited, is fast being replaced in this country, especially in the estimation of the higher grade of stock-owners, by a race of men some of whom, for scientific culture and general attainments, are not surpassed by the best educated members of our own profession. The names of the late Mr. Youatt, of Prof. Simonds, and Prof. Gamgee are familiar, not only to graziers and veterinarians, but also to those amongst ourselves whose range of reading is not circumscribed by the strict boundaries of human pathology. To such as these (for we only mention them as samples of an estimable order of scientific men) we, as physicians and sanitarians, and the public at large, owe a debt of gratitude which has hitherto received but little public recognition. It is not for us at the present time to point out in what particulars their researches have tended towards the advancement of the science which it is our business to cultivate; we simply desire, for ourselves, to acknowledge our obligations to the learned veterinarians both of this country and of the Continent, in the expression of which we have placed on our list with Dr. Cobbold's work the title of a recent work of Prof. Gamgee, and of one of the journals which circulate among the members of the veterinary profession, and which, we are happy to say, find a place upon the table of the public libraries to which we are all accustomed to resort.

The first part of Dr. Cobbold's work is devoted to systematic helminthology, and he there gives a general account of the habits, structure, development, affinities, distribution, and classification of the entozoa and their allies. In his second part he enters more fully upon the consideration of those amongst them which take up their abode in the body of man. But, first of all, he defends the practice of those who, like himself, in place of distributing these parasitic animals amongst the several classes of invertebrata into which their structure would severally locate them, group them all together in one class of "Entozoa"—regarding them, in fact, as "a distinct *fauna*, destined to occupy an equally peculiar territory." This he does on the ground of convenience, and also of the remarkable character which they exhibit of migrating at different phases of their existence, not only from one class of animal or one individual of a class to another, but even sometimes to localities which would lead and which have led observers to overlook their relation to the entozoa altogether: "None of the entozoal parasites continue in one stay; all have a tendency to roam; migration is the very soul of their prosperity; change of residence the *sine quâ non* of their existence; whilst a blockade in the interior, prolonged beyond the proper period, terminates only in cretification and death." (p. 4.) It is not always possible to trace distinctly the wanderings which every species undertakes, but where observation fails a surmise may be made from what is known of the habits of allied species.

The following scheme exhibits the classification of entozoa adopted by Dr. Cobbold. We have, as will be seen by reference to his work, united here several tables into one, and have included in ours the several species which take up their residence in the body of man:

Class Helmintha.

Subclass I.—Sterelmintha.

Orders.	Families.	Genera and species infesting man.
1. Turbellaria	1. Planaridæ. 2. Nemertidæ.	
2. Trematoda	1. Monostomidæ.	
	2. Distomidæ	*Fasciola hepatica*, Linnæus. *Distoma lanceolatum*, Mehlis. „ *ophthalmobium*, Diesing. „ *crassum*, Busk. „ *heterophyes*, Siebold. *Bilharzia hæmatobia*, Cobbold.
	3. Tristomidæ.	
	4. Polystomidæ	*Tetrastoma renale*, Delle Chiaje. *Hexathyridium pinguicola*, Treutler. „ *venarum*, Treutler.
	5. Gyrodactylidæ.	

Subclass II.—Cœlelmintha.

3. Nematoda	1. Anguillulidæ.	
	2. Gordiidæ	*Dracunculus medinensis*, Cobbold. „ *Loa*, Cobbold.
	3. Oxyuridæ	*Oxyuris vermicularis*, Bremser.
	4. Filaridæ	*Trichocephalus dispar*, Rudolphi. *Filaria lentis*, Diesing. „ *trachealis*, Cobbold. *Trichina spiralis*, Owen.
	5. Cheiracanthidæ.	
	6. Ascaridæ	*Ascaris lumbricoides*, Linnæus. „ *mystax*, Rudolphi.
	7. Strongylidæ	*Strongylus bronchialis*, Cobbold. *Eustrongylus gigas*, Diesing. *Sclerostoma duodenale*, Cobbold.
	8. Cucullanidæ.	

Subclass III.—Anenterelmintha.

4. Acanthocephala	Echinorhynchidæ.	
5. Cestoda	1. Tæniadæ	*Tænia solium*, Linnæus. „ *mediocanellata*, Küchenmeister. „ *acanthotrias*, Weinland. „ *flavopuncta*, Weinland. „ *nana*, Von Siebold. „ *elliptica*, Batsch. „ *marginata*, Batsch. „ *echinococcus*, Von Siebold.
	2. Bothriocephalidæ	*Bothriocephalus latus*, Bremser. „ *cordatus*, Leuckart.
	3. Tetrarhynchidæ.	

From this scheme it appears that there are thirty-one distinct animals which, in some phase or other of their existence, infest the body of man, and that these animals are furnished out of three orders of worms and belong to nine families. In our review of this part of the subject we shall confine our attention almost exclusively to these species, families, and orders.

I. The *Trematoda,* or flukes, during the several phases of their development, perform migrations from parasitic to non-parasitic abodes. The family, *Distomidæ,* is distinguished by the presence of two suckers, one connected with the mouth, the other being usually on the ventral surface. In the Distoma conjunctum, which Dr. Cobbold takes as the type of the family, the mouth communicates through the medium of an oval œsophageal bulb, with two long digestive canals terminating in cæcal ends. There is in the same individual both a male and a female generative system, ovary and testis, each having a separate outlet at the "reproductive papilla," situated near the ventral sucker. There is further an excretory, or "water-vascular system," in the form of two straight tubes, which, passing downwards, coalesce in the median line, where they combine to form a broad sigmoïdal duct. The most interesting part about these animals is the method of their development. It has been supposed that the adult animal was self-impregnating, but Dr. Cobbold tells us that he has seen an actual sexual congress between two individuals of the species D. conjunctum. The changes undergone by the Distomidæ from the ovum to the mature sexual animal vary considerably with altering conditions of season, weather, &c., but the following appears to be a sufficiently accurate outline of their mode of development :—*a.* The egg, which may or may not be provided with a lid, first exhibits the usual process of yolk segmentation, and there is then formed within it a finely ciliated embryo, which escapes free either prior or subsequently to its arrival upon or within the bodies of certain mollusks. *b.* The embryo, having become free, developes into a "*sporocyst*" or germ-sac, or into organized "*rediæ,*" or nurses, provided with head, mouth, œsophageal bulb, and cæcal stomach. Within the creature at this stage are developed a progeny of *cercariæ* or larvæ, each presenting two suckers and a dark forked line indicating the first appearance of the diastomic digestive system. *c.* These cercarial larvæ escape from the rediæ or sporocysts, and are then free, swimming, tailed animals. In this condition they again become parasitic in or upon some mollusk or aquatic insect, where they assume a pupa condition, becoming encysted, and losing their tails. *d.* In this condition, by the accidental swallowing of its "host," the distoma becomes transferred to the intestine of some higher animal, being then provided with cephalic hooks, and once in its final resting-place its reproductive organs become developed, and it assumes the characters of an adult distome. In the *Fasciola hepatica,* or common liver fluke, all the tissues of the body are contractile, but its locomotion is aided by the two suckers, the lower one acting as an anchor. In this animal the primary digestive tubes are beautifully branched, and contain biliary matters, epithelium scales, and blood corpuscles, on which it feeds, although Dr. Cobbold thinks it probable that it also derives nutriment by absorption through its skin. The generative organs are very complicated, and the male system is said to terminate in an intermittent organ, which is commonly found protruding in the dead fluke. The eggs when placed in water do not, according to Cobbold, acquire an imperfect embryonic development under a period of six weeks. It has, when escaped, a ciliated covering, and, like other animalcules, displays great activity in water, describing gyrations and circles, but when the ciliated covering drops off its mode of progression is "creeping." Little appears known of the higher larval conditions of the fluke, so that its progress to the mature form is matter rather of inference from what happens in other allied species than of observation. The following is Dr. Cobbold's summary of what is known and what is probable as to the phases, migrations, and habits of this animal:

> "1. The *Fasciola hepatica*, or sexually mature fluke, is especially prevalent in sheep during the spring of the year, at which time it constantly escapes from the alimentary canal of its *host*, and is thus transferred to open pasture grounds. 2. It has been shown by dissections that the liver of a single sheep may, at any given time, harbour several hundred specimens of the fluke, and it is certain that every mature entozoon will contain many thousands of minute eggs. 3. The escaped flukes do not exhibit powers of locomotion sufficient to prove them capable of an extended migration, but their movements may subserve the purpose of concealing them within the grass or soft soil where they have fallen. Their habit of coiling upon themselves probably facilitates the expulsion of their eggs. 4. The eggs can only escape from the oviduct of the entozoon one at a time, but there is no doubt whatever that prodigiously large numbers of loose ova are expelled the infested sheep in the same manner as the flukes themselves. 5. By the dispersing agencies of winds, rains, insects, feet of cattle, dogs, rabbits, and other animals, and even by man himself, the eggs are carried in various directions, not a few of them ultimately finding their way into pools, ponds, ditches, canals, and running streams. 6. The freed eggs, at the time of their maturity, contain ciliated embryos, capable of active progression when brought in contact with dew on blades of grass, rain drops, pools of water, ponds, and lakes. The prolonged action of moisture without, aided by vigorous movements of the perfected embryo within, serves to loosen the lid-like end of the egg-shell, by the opening of which the animalcule is set free. 7. The ciliated embryo, which is furnished with a solitary X-shaped eye, after a longer or shorter period of activity, loses its ciliated covering, and becomes comparatively inert. It alters its form, and probably soon afterwards gains access to the body of a fresh-water mollusc, or, possibly, into the tissues of a land snail. 8. Once within the viscera or substance of its so-called *intermediate host*, the now-ciliated larva probably becomes transformed into a large sac, and developes new larvæ within its interior. These sac-like larvæ are called 'nurses' or 'sporocysts,' or when rather highly organized, 'rediæ.' 9. The contained nurse-progeny or higher trematode larvæ, are probably furnished with tails as in other flukes. When fully developed they constitute the well-known Cercariæ. 10. The Cercariæ have a tendency to migrate from the bodies of their molluscan hosts. and they are quite capable of an independent existence. During these wanderings in the water, they are occasionally brought in contact with the human

body, and in a few instances appear to have succeeded in penetrating the skin. 11. It is not certain whether the Cercariæ are taken into the bodies of quadrupeds when the latter are drinking water or eating solid food, but it is probable that they are passively transferred in either way. It is not unlikely that they are often swallowed while still resident with the bodies of their molluscan hosts. 12. From the digestive organs of sheep or cattle the Cercariæ make their way into the liver, in which new situation they probably part with their tails and become encysted. This constitutes the so-called *pupa stage*. 13. The pupa, thus encysted for many weeks or even months, attains a higher organization, at last becoming converted into the sexually mature *Fasciola hepatica*. It gains access to the liver ducts, then passes into the common biliary outlet, and from thence is transferred into the intestinal canal, being finally expelled its vertebrate host in the manner previously described." (p. 181.)

The *Distoma lanceolatum* is smaller than the *Fasciola hep.*, measuring rather more than ⅓ inch in length, and about 1½ line in breadth. Its most common habitat is the liver of the ox, but it has also been met with in the sheep, red and fallow deer, rabbit, hare, and cat. In this animal the contents of the ova attain a tolerably high degree of development before the eggs quit the oviduct of the parent; and hence it is not considered improbable that the subsequent larval metamorphoses are accomplished more rapidly than in the *Fasciola*. The free ciliated embryo is globe-shaped, with a central boring spine. The *Distoma ophthalmobium* is suspected by Cobbold and Weinland to be identical with the *Monostoma lentis* of Von Nordmann; and both, Cobbold thinks, may be referable to the species last described, *D. lanceolatum*. *D. Crassum* measures from 1½ to 3 inches, with a breadth of ⅝ inch, and it is characterized by its uniform and considerable thickness. The most minute of the human trematodes, however, is the *D. heterophyes*, which measures only ¾ line in length, and ¼ of a line in breadth; it has an oblong, pyriform outline, the body is compressed throughout, and the surface is covered with numerous minute spines. In the *Bilharzia hæmatobia*, the male and female reproductive organs occur in separate individuals. The male is a cylindrical vermiform worm ½ inch, or rather more, in length; while the female is filiform, longer, and much narrower than the male, being about ⅘ inch long. It is the *D. hæmatobium* of Dr. Bilharz, of Cairo. It infests in the mature condition no animal lower than man and monkeys. Griesinger conjectures that the young of the animal exist in the waters of the Nile, in its fishes, and even in bread, grain, and fruit.

The *Nematoda*, so named from the threadlike form of their body, are usually called *round worms*. They bear, as a whole, some resemblance in external form to the earthworm. Most of them are only parasitic during a portion of their lifetime, although this period of their non-parasitic existence is comparatively short. The family of *Gordiidæ* is characterized by an extremely elongated body, with a mouth and intestinal canal, the latter ending in a cæcum, and not by an anus. At present the female only of the *Dracunculus medinensis* is known. It measures from 1 to 12 feet in length, and about $\frac{1}{10}$ in.

in thickness. Its mode of reproduction, like the Gordiidæ generally, is viviparous, the numerous young, invested by the uterine walls, almost filling up the entire cavity of the body. The head has a rather flatly convex outline, and near its centre four papillæ or rudimentary tentacles project at equal distances from each other, and from the oral aperture. The digestive apparatus consists of a cylindrical tube extending to the concavity of the tail, where no anus is perceptible. Bastian, who has fully described this worm, was unable to discover any vagina or vulva, and as this coincides with the observations of others, it is clear that the young can only escape by the rupture of the maternal body either before or after its decomposition, and escape from the "host." We may again quote from Dr. Cobbold his summary of the life history of this worm :

"1. The guinea worm, as commonly known, is the adult female condition of a nematode parasite, forming a distinct generic type, for which the title of Dracunculus ought still to be retained. 2. The female D. is parasitic only during the final stages of its life-period, after it has taken up its residence in the subcutaneous and intermuscular cellular tissue of man, dogs, and horses. 3. The adult female reproduces viviparously; and in consequence of an enormous development of the internal reproductive organs, contains myriads of embryos in all stages of development. 4. The embryos, when set free, are capable of sustaining an independent existence; this vitality is so tenacious that, after a more or less complete desiccation, they will revive on the application of moisture. 5. The proper habitat of the free active embryos may be either the fresh water of natural and stagnant pools, the damp mould and mud of low-lying, marshy districts, or especially the soft, ochreous, argillaceous, clayey soil forming the bottom of wells, tanks, and other artificial reservoirs. 6. The male sexually mature Dracunculus is at present unknown; in all probability it is very much smaller than the female, non-parasitic, as far as animal bearers are concerned, and a *constant* inhabitant of fresh water, mud, or moist earth. 7. In all likelihood, the male Dracunculus bears a close resemblance to Urobales palustris, or to some other of the numerous allied microscopic forms of Filaria, which abound in the natural and artificial water reservoirs above mentioned. 8. The young Dracunculi probably acquire sexual maturity shortly after their escape from the parent; the sexes associating in muddy waters during the monsoon, after which period the males, in all likelihood, rapidly perish, the females being left to watch their opportunity for further development by migration into the human body. 9. The impregnated females do not gain access to their bearers by the mouth or stomach of the latter; on the contrary, there is every reason to believe that they enter the body in a direct manner, probably by penetrating the sudorific ducts of the skin. 10. Within the tissues of the bearer they grow with considerable rapidity, and in about twelve months, more or less, give rise to a formidable entozootic disease (*dracontiasis*) which, after prolonged monsoons, is not unfrequently severely endemic." (p. 387.)

Dr. Cobbold regards the *D. Loa* as a distinct worm from the *Filaria oculi* of Nordmann and others. The term "Loa" is the native name of the worm, which has a wide geographical distribution.

The only representative of the family of the *Oxyuridæ* which we need notice is the *Oxyuris vermicularis*, the common threadworm which is such an annoyance to young children. One of its most remarkable anatomical characters is its possession of a strong œsophageal bulb, with tooth-like crushing organs; below this is the stomach, which merges into an intestinal canal, the latter terminating in an anus. The most important of its characters is, of course, its mode of development, but of this little is known. Dr. Cobbold, however, asserts in opposition to Küchenmeister, that in fresh specimens of impregnated oxyuridæ he has almost invariably discovered well-formed tadpole-shaped embryos. Nothing definite is known of the migration of the larvæ:

> "I have introduced the eggs containing embryos into various animals, but have not yet succeeded in rearing oxyurides. I have also intoduced them into the pulpy parenchyma of apples and pears, but I have not been able to satisfy myself that any of the young nematodes, which I subsequently procured by thousands in one or two of the pears, were the result of these experiments." (p. 369.)

Dr. Cobbold says that the genus *Filaria* has hitherto served as a sort of refuge for the destitute. With a view to assist in an improved classification of these nematodes, he says:

> "Provisionally I shall include in the above family title [*Filaridæ*] all those nematodes presenting the following characters: body filiform, smooth, or finely striated transversely, furnished with a simple round or triangular mouth, generally surrounded by a variable number of papillæ; head continuous with the body; anus terminal, or nearly so; tail of the male obtuse, bluntly pointed or slightly expanded; penis consisting of a long spiculum, which is often accompanied by a short accessory piece." (p. 68.)

Passing over the structural peculiarities of the three other members of this family, which infest man, we shall limit our notice here to the most important of the four, *Trichina spiralis*—a worm to which public attention has been much directed during the last two years, and the acquaintance with which by medical men in this country has been greatly promoted by the papers published by Dr. Althaus. And here, for the first time, we come upon an animal which gains access to the human frame through the eating of the flesh of animals which are infested with it. The following is Dr. Cobbold's description of the general and specific characters of the worm in the mature state:

> "An extremely minute nematode helmipthe; the male, in its fully developed and sexually mature condition measuring only $\frac{1}{18}$th of an inch, whilst the perfectly developed female reaches a length of about $\frac{1}{8}''$; body rounded and filiform; usually slightly bent upon itself, rather thicker behind than in front, especially in the males; head narrow, finely pointed, unarmed, with a simple central minute oral aperture; posterior extremity of the male furnished with a bi-lobed caudal appendage, the cloacal or anal aperture being situated between these divergent appendages; penis consisting of a single spicula cleft above, so as to assume a V-shaped outline; female shorter than the male, bluntly rounded posteriorly, with the genital outlet placed far forward at about the end of the first fifth of the long diameter of the body; eggs measuring $\frac{1}{1250}''$ from pole to pole; mode of reproduction viviparous." (p. 335.)

In its larval condition it is found in the form of a spirally coiled worm in the interior of small globular, oval or lemon-shaped cysts, which appear as minute specks scarcely visible to the naked eye. Dr.

Cobbold considers with Leuckart that the cysts are not requisite. They are, in fact, an abnormal condition which may be absent. The larvæ may exist in one "bearer" to the number of at least twenty millions. Pigs and men are most commonly infested with these creatures, but they have been found in dogs, cats, certain birds, and the horse, ox, sheep, and other ruminants, as well as being obtained from rabbits, rats, mice, and guinea-pigs, which have been fed with trichinous flesh. When such flesh is eaten, what happens is this: the flesh is digested, and thus the larvæ are set free; from the torpid state in which they lay they awake up and begin to move about, lose their spiral figure, and become stretched; at the same time they grow rapidly, and the generative organs are developed. Larval trichinæ have attained sexual maturity within less than forty-eight hours after introduction into their new "bearer." Most females contain from three hundred to five hundred ova. In six days the female parasites will contain perfectly developed and free embryos in their interior; and when these have acquired their full size they pass out at the vaginal opening. Soon after birth the larval trichinæ begin their wanderings, penetrating directly through the intestinal walls and peritoneum, and then, without entering the blood-vessels, rapidly working their way through the tissues in all directions until they arrive at the several voluntary muscles of their "host." They seldom stop in any non-muscular organ. We have, however, ourselves seen what we believed to be larval trichinæ in thousands in the lungs of a cat, and Cobbold appears to have seen the same. Virchow has seen them in the heart. Having selected their permanent resting-place, they become encysted by alteration of the sarcolemma. The same cyst may contain from one to three trichinæ. After a few months' residence in this situation the cysts become calcified. The vitality of these worms varies with their condition. The adult worms, if their bearer die, do not survive him above six hours; but the larvæ will live for a long time even in flesh which has already undergone putrefaction. In this way, as has been suggested by Davaine, "the *débris* of an animal devoured by carnivora may become fatal to rodents, or a carcass near a marsh or rivulet may communicate the parasites to the ruminants which drink the water, or to pigs." We shall conclude what we have to say upon this part of the subject by the following summary, which Dr. Cobbold derives from Leuckart:

"1. *Trichina spiralis* is the juvenile condition of a little round worm, hitherto unknown, to which, however, the generic names of Trichina must remain attached. 2. The sexually mature trichina inhabits the intestinal canal of numerous warm-blooded animals, especially mammalia (also of man), and constantly in great numbers. 3. At the second day after their introduction, the intestinal trichinæ attain their full sexual maturity. 4. The eggs of the female trichina are developed within the uterus of the mother, into minute filaria-like embryos, which from the sixth day are born without their egg-shells. 5. The new-born young soon after commence their wandering. They penetrate the walls of the intestine, and pass directly through the abdominal cavity into the muscles of their bearers, where, if the conditions are otherwise favourable, they are developed into the form hitherto known. 6. The direction in which they proceed is in the course of the intermuscular connective tissue. 7. The majority of the wandering embryos remain in those sheathed muscular groups which are nearest to the cavity of the body (abdomen and thorax), especially in those which are smaller, and most supplied with connective tissue. 8. The embryos penetrate into the interior of the separate muscular bundles, and here already, after fourteen days, acquire the size and organization of the well-known *Trichina spiralis.* 9. Soon after the intrusion of the parasite, the infested muscular fibre loses its original structure. The fibrillæ collapse into a finely granular substance, whilst the muscular corpuscles change into oval nucleated cells. 10. The infested muscular bundle retains its original sheathing up to the time of the complete development of the young trichinæ, but afterwards its sarcolemma thickens, and begins to shrivel at the extremities. 11. The spot inhabited by the rolled up parasites is converted into a spindle-shaped widening, and within this space, under the thickened sarcolemma, the formation of the well-known lemon-shaped or globular cysts commences by a peripheric hardening and calcification. 12. The migration and development of the embryos also take place after the transportation of impregnated trichinæ into the intestines of a new host. 13. The further development of the muscle trichinæ into sexually mature animals is altogether independent of the formation of the calcareous shell, and occurs as soon as the former have reached their completion. The male and female individuals are already recognisable in their larval state." (p. 342.)

Of the family of Ascaridæ, the *A. lumbricoïdes* requires no description. We may merely say that it discharges its ova by the vaginal outlet, and that they pass off from the bowels of the host *per anum.* Probably they complete their development in open waters, where it seems that an interval of some six months must elapse before the embryo is formed. It is not known what wanderings it now undergoes, or in what form it gains access to its future host, but it is probably taken in with river or pond water. The *A. mystax* of the cat is also liable to infest the human body. It is a moderate sized nematode, characterized more especially by the presence of conspicuous alaform appendages, one on either side of the head. The male may reach 2½ inches, and the female about 4 inches in length. It is unnecessary that we should enter at all at length into the structure or development of this worm, which probably gains access to the stomach through the same media as the *A. lumbricoïdes.*

We pass now over the family of *Strongylidæ* to the consideration of the important order of *cestode* worms, or *tape-worms*, of the life history of which our knowledge is much more extensive and accurate. The following extract will enable the reader the better to follow the descriptions we are about to give:

"The tapeworm may be looked upon as a creature compounded of a series of partly dissimilar animal forms, closely linked in single file; and the welfare of this peculiarly associated colony is, in a great measure, dependent on its connexion with the so-called head. . . . . Every cestode passes through several distinct phases during its life-history. In the ordinary colonial or tapeworm condition it has been termed the *strobila* (Van Beneden.) The separate joints of which the strobile is composed are denominated *proglottides*, or zooids. The anterior segment forms the *head*, and remains barren, those of the neck and front part of the body being sexually immature during the process of strobile formation. The mature proglottides at the caudal end are capable of realising an independent existence, and the eggs which they contain develop the six-hooked embryos, or *proscolices* (Van Beneden), in their interior. These latter become metamorphosed into *scolices* or nurses, representing the well-known cysticercal state, which, in its sterile or aborted condition, forms the common *hydatid.*" (p. 104.)

The family of the *Tæniadæ*, or true tapeworms, have a small distinct head, with four single oval or round suctorial disks, and a rostellum or proboscis which is retractile, and frequently armed with a crown of hooks. The reproductive orifices are mostly at or near the margins of the joints, which are bisexual. The family of *Bothriocephalidæ* have heads furnished with two or four opposed bothria, or fossettes, often armed with hooks. The mature proglottides vary much in size; but, in the more typical forms, the segments are broad and narrow, having their reproductive outlets side by side at or near the centre of each joint. With this introduction, then, we shall proceed to the several cestode worms found in man, chiefly, however, confining our attention to those points in their life history and development, which are of the highest practical importance. Although Dujardin, Eschricht, and Von Siebold had already shown that the cystic worms, hydatids, acephalocysts, &c., were only phases in the development of cestodes, yet the merit of demonstrating this experimentally lies with Küchenmeister. The only point in the ordinary anatomy of the *Tænia solium* to which we shall refer is one to which Dr. Cobbold particularly calls attention—we mean the water-vascular system, which is still commonly regarded as a digestive system. It consists of two main channels, one passing down on either side of the worm, both being connected by a transverse vessel at one end of every joint. The male reproductive organs in each joint consist of testicular sacs, a vas deferens, and penis; and the female organs of an ovarium, branched uterus, seminal reservoirs, and a vaginal canal. The *scolex*, or larval condition of this tænia constitutes the *Cysticercus cellulosæ* which is so commonly found as the "measle" in the pig, and which presents in pork the appearance of an elliptical or reniform hydatid, of the average diameter of ⅓″. If the measle be dissected, it is found that the vesicular portion merely consists of the bladder-like caudal extremity of the larva, within which the head, neck, and vermiform body lie retracted and coiled up. The development of the tænia is thus described by our author:

"After the proglottis (which, it must be borne in mind, is furnished with male and female reproductive organs), has undergone impregnation by contact with another proglottis, there results from this the formation of eggs within it, which eggs, while still in the body of the parent, develop into embryos, the latter still retaining the egg coverings. At this time the proglottis is about to undergo a passive migration; and having detached itself from the strobila, it is soon expelled from the bowel of the host, thus finding its way into some cesspool, or it may be, into the open fields. The proglottides move about for a time, but the growth of the multitudes of embryos within their interior causes the proglottides sooner or later to burst, and the embryos thus become dispersed; some are then conveyed down drains and sewers, others are lodged by the roadsides in ditches and waste places, while great quantities are scattered far and wide by winds or insects in every conceivable direction. Each embryo is furnished with a special boring apparatus, having at its anterior end three pairs of hooks; the entire group of embryos of any single proglottis is consequently called 'the six-hooked brood.' After a while—by accident, as it were—a pig coming in the way of these embryos or of the proglottides is liable to swallow them with matters taken in as food. The embryos, immediately on being transferred to the digestive canal of the pig, escape the egg-shells and bore their way through the living tissues of the animal, and having lodged themselves in the fatty parts of the flesh, they there rest to await their further transformation, or destiny. The animal thus infested becomes measled, its flesh constituting the so-called measled pork. In this situation the embryos drop their hooks or boring apparatus, and become transformed into the *cysticercus cellulosæ.* A portion of this measled meat being eaten by ourselves, either in a raw or imperfectly cooked condition, transfers the cysticercus to our own alimentary canal, in which locality the cysticercus attaches itself to the wall of the human intestine, and having secured a good anchorage, begins to grow at the lower or caudal extremity, producing numerous joints or buds to form the strobila, or tapeworm colony." (p. 220.)

The *T. mediocanellata* may be distinguished from the *T. solium* by the greater size and thickness of the segments, the absence of rostellum and hooks, and the blackish appearance of the head in consequence of much pigment granules around the suckers. It derives its name from the presence of a main transverse channel of the water vascular system running through the free space between the four sucking discs, and sending branches to and around the suckers. The "cysticerci," or "measles," which constitute the larval condition of this worm, are met with in the muscles and internal organs of cattle.

Referring to Dr. Cobbold's book for what is known of the other tæniæ, we proceed to the consideration of the last one on the list, the *T. echinococcus*, the importance of which to us as medical men cannot well be exaggerated. The tapeworm in its mature state is very small, seldom exceeding one-fourth of an inch in length, and developing but four segments. In this, its strobila condition, it is only found in the dog and wolf. Dr. Cobbold agrees with Leuckart in maintaining, in opposition to Küchenmeister, that the several varieties of hydatids to which the human body is subject proceed from only one species of tapeworm. Into this controversy, however, we must not enter, but go on to describe, as nearly as we can in Dr. Cobbold's own words, the development of this remarkable and interesting worm, and especially the formation of the hydatids, which prove so fatal to man. It is indeed difficult to do this without reference to the admirable engravings with which Dr. Cobbold illustrates this and the other subjects in his book. We may start from the time when the six-hooked embryo which is met with as in other tæniæ has bored its way to the liver, or has been carried in the circulating stream to other organs. When arrived at its resting-place it becomes transformed into the acephalocyst, or hydatid. And here it is to be observed, that it differs from the other larval tæniæ in retaining a more or less globular figure, in place of presenting the distinctions of head, neck, and body. Although the mature worm is confined to the dog and wolf, the hydatid is met with, not in man only, but in the ruminants generally, the horse, ass, &c. When a hydatid is removed from its cyst and dissected, it is found to consist of two membranes, an *ecto-cyst* and an *endo-cyst.*

> "The first indication (of what is subsequently to become an echinococcus head, or a group of heads), consists of a slight papilliform elevation at the inner surface of the endocyst. This prominence—which does not hitherto appear to have been recognised in its very earliest stage—after a short while displays in its interior a vacuole-like cavity, the latter being occupied, however, with a clear limpid fluid. Its margin becomes more and more clearly defined, until the cavity is by and by seen to be lined with a distinct cuticular membrane. The papilla increasing in size, becomes at first elongated or oval, eventually, scoliciform, or even, perhaps, a true echinococcus head. . . . . The scolex-like development has now—possibly, it may be, not in every case—has now, I repeat, to sacrifice itself by developing in its interior a brood of scolices or echinococcus heads. In other words, it becomes gradually transformed into the so-called brood-capsules of Leuckart and other authors. All observers who have microscopically examined fresh echinococci must have seen these capsules. Portions of the essential vital endocyst here forming the outer wall of the brood capsule now thicken in the same way that the original maternal endocyst had done, and these thickened portions in their turn become true scolices, or in some cases, scolicecoid formations. By a process of inversion—precisely similar to that which has been so often described and figured in the case of Cœnurus—the heads are withdrawn, as it were, into the cavity of the brood capsules; and thus the latter display the bird's-nest-like appearance. . . . Before proceeding further, I may here remark that many modifications of this process have been witnessed as regards individual scolices, some of which abort, whilst others, possibly, become new or secondary brood capsules. All those numerous instances where scolices have been seen free in the cavity of the capsules or in the great general cavity of the maternal hydatid, or in the cavities of the (subsequently to be described) daughter and granddaughter hydatids, are simply examples of morbid phenomena. . . . . In this condition the scolices are generally quite dead." (p. 264.)

The proliferation of the hydatid, by which "daughter" and "granddaughter" (secondary and tertiary) hydatids become formed in its interior, is held by our author as well as by Naumyn, whom he quotes upon this subject, to be brought about by a differentiation of the bud developments "which, instead of becoming brood-capsules, become daughter and granddaughter vesicles, constantly developing in their interior secondary and tertiary brood capsules and scolices, but sometimes, it would appear, developing neither the one nor the other." (p. 269.)

Dr. Cobbold thus sums up his view of the process:

> "With Huxley, I still regard the endocyst as forming solitary scolices. Some of the scolices become differentiated to form brood capsules, a portion of whose individual echinococcus heads may in their turn become secondary brood capsules, whilst others fail to become either scolices or secondary brood capsules. It also accords more with our knowledge of the general plan of development to believe that the daughter and granddaughter hydatids are likewise peculiarly modified scolices; in which case it is obvious that they must commence by a process of budding from the endocyst, as in point of fact Naumyn states they do. It does not seem probable that the secondary and tertiary hydatids should arise from independent granular points within the laminæ of the non-vital ectocyst. For the acceptance of my view it is not

even necessary to perceive a thorough scoleciform character in the primary buddings destined to become daughter vesicles; it is sufficient if the original process of differentiation clearly resembles the papilliform commencement of the ordinary scolex head." (p. 270.)

Of the *Bothriocephalus latus*, Dr. Cobbold says:

> "At present our knowledge of the history of its development is incomplete; but sufficient, at least, has been accomplished to enable us to set aside the erroneous notions advanced by Vogt and others as to its mode of introduction into the human body."

The 6-hooked embryo is ciliated at first, and swims about like the volvox. After it loses its ciliated covering, the embryo probably takes up its abode in some intermediate host, but what particular kind of host is undetermined, Dr. Cobbold thinks probably some kind of fish of the salmon or trout family.

II. Let us now consider the subject very briefly as respects those animals which we use as food, and in its relation to diseased meat.

1. *Measles in the Pig.*—The extent to which this disease prevails is stated by Mr. Gamgee to be much greater in Ireland than in Britain. The Irish have an adage that "every pig has its measle," and Mr. Gamgee has been informed by a Wiltshire bacon factor that, whereas not one pig reared in England or Scotland is measled, Irish pigs in some years suffer to the extent of six, seven, or eight per cent. It is most prevalent in those parts of Ireland where pigs are reared in small lots by poor people.

> "I found," he says, "that measles was very rife in some parts of Cork, in Limerick, Tipperary, and Queen's County. . . . . . It is certain, however, that those pigs suffer most from measles that live in common with human beings; that are allowed to roam about at will, and to eat human excrement around the cottages in the roadside, &c. A very few people affected with tapeworm discharge joints enough to contaminate an immense number of pigs."

The fact of a pig being measled is no bar to its sale. Measled pigs are brought to market with healthy pigs, and the only difference made is that, if seriously measled, a reduction is made in the price. "Measly bales of ham and bacon are regular articles of trade, and though sold but little in Ireland (where the disease is known), are largely exported for Glasgow and other large towns in England and Scotland."

Such bacon, we are told, is sold at about three shillings per flitch less than sound bacon. Mr. Gamgee says that some retailers order measly flitches specially, and all that Waterford can supply go to London. That pigs reared in large towns should suffer from a variety of parasitic diseases cannot be matter of surprise, from the mode of feeding commonly adopted. Although pigs first introduced into town piggeries often refuse at first the food offered them, yet in time they learn to feed like their brethren. Mr. Gamgee tells us how that is in Edinburgh, and we have reason to believe that similar practices are pursued in London. It is here, at any rate, a common practice to establish piggeries in neighbourhoods where offal and entrails of sheep and cattle can be procured readily.

> "It is a common practice to feed pigs on the flesh of horses and of other diseased animals, or on the entrails of cattle and sheep that cannot be utilised so profitably in any other way. This animal food is supplied, as a rule, without being cooked, and only mixed with the vegetable matter and fæces contained in the alimentary canal of the herbivorous quadrupeds. . . . . I have referred to the gross mismanagement of slaughter-houses. Not an insignificant part of that mismanagement in Edinburgh is permitting entrails, diseased organs, and sometimes condemned carcases, to be carted away by farmers, who throw the whole, raw, to their pigs. It is evident that no more certain means could be devised to spread parasitic diseases in such animals, and to render them unfit for human food; and I think it will be admitted that animals should not be fed so that they may merely increase rapidly in bulk, to be slaughtered as human food, when such system of feeding renders them diseased.
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> "I have made careful inquiries as to the health of carnivorous pigs, and find as follows: That sows fed on flesh give birth to pigs which cannot be reared, but die shortly after being born; that if any young pigs are admitted to the flesh diet they also soon die; that pigs of two or three months old seem to thrive on flesh, though the mortality amongst them is sometimes considerable; that pigs fed on flesh have a peculiarly soft, diffluent fat, emit a strong odour from their bodies, and after death putrify more rapidly than others. I also find that when any pigs die on the establishments above noticed they are devoured by their companions, and frequently boiled for that purpose." (*Loc. cit.*, p. 281.)

Possibly some of those instances in which pork has been found to produce disturbance of the digestive system of those who have eaten it, but nevertheless where no morbid condition has been apparent in the meat, may find an explanation in this unnatural and disgusting method of feeding.

It is unnecessary to enter at any length into the physical appearances presented by measled pork. A few cysticerci may escape observation, but when the flesh is badly measled it presents on section a disgusting spawn-like appearance from the confluence of the cysticerci. "The presence of many cysticerci in the flesh," says Mr. Gamgee, "leads to an open condition of the texture favourable to the imbibition of fluids, and for this reason measly pigs are easily pickled."

2. We have no data at present on which to form even a surmise as to the degree of prevalence of *Trichina disease* amongst our pigs. Probably it is a comparatively rare disease in this country. All that Dr. Cobbold can say about it is contained in the following passages:

> "Persons qualified to judge affirm that the trichina appears in pigs of all races, and that since cooking does not always kill the worm, it is necessary, whenever a pig is killed, to examine the meat through a microscope. . . . . The notion that particular breeds of swine are more liable to be infested than others is scarcely likely to prove correct, especially when it is considered how many other kinds of domesticated animals are liable to the same parasite-invasion." (p. 344.)
>
> "The signs of the disease in the animal are said to be loss of appetite, a hoarse voice, quietness, and aversion to all kinds of movement or running, the latter function, when attempted, being attended with dragging of the extremities." (p. 245.)

But yet an instance is quoted where a pig showed none of these symptoms, being considered "*all right;*" yet the unfortunate butcher who killed the pig has since died from eating its flesh. Trichinous pigs moderately affected may even look fat and plump.

It is evident, from what has been said, that the detection of trichinous pork can only be accomplished by a microscopical examination. The meat at first sight *may* present no appearances calculated to raise a suspicion of its poisonous character. The mode of conducting such an examination is fully detailed by Dr. Althaus:

> "I have already mentioned that the cysts are visible to the naked eye as whitish, round, or ovoïd specks, with which the surface of the muscle is sprinkled. If these are touched with a drop of acetic acid, or better still with diluted hydrochloric acid, the lime is dissolved and the white colouring disappears. This experiment is, however, not perfectly reliable, if larger pieces of flesh are examined; for the acid then produces a deposit from the muscular juice, whereby the whole surface becomes indistinct and turbid. It is therefore the best plan to cut off a very small piece of flesh with a fine pair of scissors, to tear this asunder with needles, and to free the cysts as much as possible from the flesh. If this is done with the glass resting on a dark object, the cysts may be clearly distinguished as whitish grains, and the dissolving power of the acids becomes quite apparent. If the spots retain their colour, it is probable that small pieces of fat, nervous fibres, or similar formations, are present. But as pieces of fat may be connected with the cysts, a negative result is not so decisive as a positive one; and it is therefore in doubtful cases always better to use the microscope in order to decide the point.
>
> "It does not matter very much from which muscles the pieces to be examined are taken. Even if there are only a few trichinæ present, they generally exist in all the muscles of the body, excepting the heart. The heart of pigs may therefore be eaten with impunity. Trichinæ are, however, more numerous in the tendinous extremities of the muscles, which is probably due to the circumstance that a large number of trichinæ penetrate as far as possible in the muscular tissue, and only stop their progress if certain impediments (as tendons) offer. . . . .
>
> "*Trichinæ which have not yet become encysted can only be recognised by means of the microscope.* A thin layer of flesh should be cut out with a sharp scalpel, spread over a glass plate, and moistened with a drop of water. If it is then covered with a thin sheet of glass, we may distinguish trichinæ, if there are any, with a magnifying power of 50. Their intimate structure, however, can only be recognised with a power of 300." (p. 17.)

3. "*Sturdy,*" "*staggers,*" "*gid,*" "*turnsick,*" are synonymes under which the disease produced by the cœnurus cerebralis is known when it occurs in sheep. It prevails wherever sheep are kept. The hydatid which occasions it is the larval condition of the *tænia cœnurus* of the dog. This has been fully and satisfactorily established not only by the experimental researches of German helminthologists, but also by those of our countryman, Mr. Gamgee. This relation is also shown by the circumstances under which the disease is practically observed to arise. Mr. Gamgee says that it occurs

> "more especially in the autumn and winter months. I find, however, that in some districts there is a greater prevalence of sturdy in summer. This occurs when, during the hot months, sheep are kept on unenclosed pastures on

hills where they must constantly be 'herded,' whereas during the winter the flock is transferred to the enclosed fields, and dogs are more or less removed from them. Sturdy will always be found to prevail on farms with open pastures, where flocks constantly need the guardianship of shepherds and dogs; or on enclosed farms where sheep are fed on turnips, confined daily within limited space, *with one or more dogs amongst them.*" (*Loc. cit.*, p. 236.)

To lessen or eradicate "sturdy," therefore, amongst our flocks, attention must evidently be directed to the dogs which go amongst them, and this both in withholding them from the food, through the medium of which the larvæ may be introduced, and also in subjecting the animals from time to time to such treatment as shall ensure the evacuation of any tæniæ which they may harbour, confining them at such times within boundaries so that the fæces passed may be collected and destroyed by fire.

4. "*Rot*" in sheep and cattle is a disease produced by the presence of "flukes" in the liver of the animals. It is more prevalent in some seasons than in others, and especially in those years which, like 1860, are characterized by excessive and continued rains; in fact, that year will long be recollected by agriculturists for its destructive effects. Mr. Simonds states that he is acquainted with instances where six hundred or seven hundred sheep in a flock were lost from this cause alone. One person he mentions who buys eight hundred Welsh ewes annually, who had not more than forty or fifty which escaped; and he states that in some parishes in Devonshire five-sixths of the sheep perished, or were sold for a few shillings each for slaughtering. In 1862 Mr. Gamgee says that the mortality was in many parts still higher than in 1860, and that he is quite certain that not less than five hundred thousand sheep suffered in that year from "rot" in the United Kingdom, reducing them in value two-thirds and more, and leading to a loss of several hundred thousand pounds to the country at large. "Scores of cases," says Dr. Cobbold, "are on record where our English farmers have individually lost three, four, five, six, seven, and even eight hundred sheep in a single season; and many agriculturists have thus become completely ruined."

As respects the causes of this prevalence of the disease it may be said that it occurs most frequently not only in wet seasons, but upon low lands and marshy pastures, and that it develops most readily from the month of June to the month of October. An exception to the influence of marshy ground is met with, however, in the case of those flocks which feed in the salt-water marshes of our eastern shores.

A "rotten" sheep may be readily known. At first he appears to lay on fat; and we have been informed that it has been customary with some graziers to place their sheep intended for the market on damp land with a view to the production of this primary result, selling them to the butcher before the subsequent ill results follow. When the disease, however, becomes fully developed, it is to be known by the ordinary symptoms of marked spanæmia; the skin becomes less unctuous than is natural, and is seen to be scaly where uncovered by hair, the fleece drops off in patches, the vessels of the conjunctiva are seen to be turgid with pale or yellowish-coloured blood, and, later still, may be scarcely capable of recognition; pressure over the loins causes the animal to wince, and gives a yielding sensation very unlike to the firm resistance the hand meets with in a sound sheep; dropsical swellings succeed, with listlessness, almost stupor, and the sheep dies in a state of hectic.

The meat of a "rotten" sheep may be known by the wasted, flabby, watery condition of all the tissues, and the absence of the normal red colour. Of course, its recognition is aided materially by the examination of the liver when the organs have not been removed from the carcass. Mr. Cobbold states also that it is by no means unfrequent to find one, or even several other kinds of entozoa existing with the fasciola in the same sheep, the most common form being that of the larval echinococcus.

As regards the prevention of the disease all that can be said is, that "moisture being essential to the growth and development of the fluke-larvæ, it is clear that sheep cannot be infested so long as they remain on high and dry grounds; and even in low pastures they can scarcely take the disease so long as they are folded, and fed on hay, turnips, and fodder procured from drier situations." The practice of mixing salt with their food seems to have been attended with good results both in a preventive and curative point of view.

III. As our object in the present article is to direct attention to the sanitary rather than the medical aspect of the subject of "entozoa," as they affect ourselves, we shall, with a single exception, confine our final remarks within the limits which such a scheme would appear to prescribe. We will take the parisites which infest man in the order in which Dr. Cobbold treats of them.

Fasciola hepatica, no doubt, occasionally infests man. Dr. Cobbold has faith in fifteen of the recorded instances. Leuckart believes only in five. Professor Partridge has found it in the gall-bladder, and Mr. Fox of Topsham, and Mr. Harris of Liverpool, have found the fluke located the former beneath the skin behind the ear, the latter under the scalp. The cercariæ, in the latter instance, probably gained access by directly penetrating the skin. Professor Simonds states that, on more than one occasion, he has known persons taken seriously ill when engaged in opening many rotten sheep at a time; and one case in which a country butcher was seized in the evening after being thus occupied with choleraic symptoms, which proved fatal in two days. The flesh of rotten beasts is necessarily lean, and hence less likely to be digestible, as well as being wanting in nutritive qualities.

Three instances are on record of the discovery of the *Distoma lanceolatum* in the human body; one of these is especially instructive. It is that of a young girl accustomed to look after sheep fed on a pasture enclosed by woods, and traversed by two water dykes, and also supplied by ten little stagnant pools which harboured numerous amphibia and molluscs. The child often quenched her thirst from the half putrid water, and probably also partook of the watercresses growing in the ditches. She was emaciated, the abdomen enlarged. After death the gall-bladder was found to contain forty-seven of these distomæ, and eight calculi.

Distoma ophthalmobium has been found in the human eye. How they have come there is a question difficult to solve. Gescheidt found four in the eye of a child five months old, born with lenticular cataract. They were situated between the lens and the capsule, and could be recognised as so many dark spots on the surface of the lens.

Fourteen specimens of *D. crassum* were discovered by Mr. Busk in the duodenum of a Lascar. No other case has occurred to Dr. Cobbold's knowledge. The museums of the Royal College of Surgeons, and of the Middlesex Hospital, contain some of these specimens.

The *D. heterophyes* was discovered in 1851 by Dr. Bilharz, of Cairo, in the small intestine of a boy; and on a second occasion he collected several hundred specimens under very similar circumstances.

The *Bilharzia hæmatobia* is also a parasite prevalent on the borders of the Nile, and has also been found in South Africa and the Mauritius. At the Cape of Good Hope it gives rise to an endemic disease. Its favourite habitat is the portal system of blood-vessels and those of the bladder. Dr. Bilharz believes that half the grown-up people in Egypt are infested with it. The symptoms it gives rise to consist of disturbance of the uro-poietic functions; diarrhœa and hæmaturia occur in the advanced stage of the disease, often associated with anæmia, colicy pains and prostration of the vital powers. The discovery of the ova of the worm in the urine and other excreta is conclusive of the nature of the illness. The disease is said to be more virulent in the summer months, probably from the cercarean larvæ being most abundant in the spring.

The *Tetrastoma renale* was found once by Lucarelli in the urine of an old woman with symptoms of calculus. Five specimens were collected, but no more were found after death.

Only one instance, also, is on record of the *Hexathyridium pinguicola* being found—namely, Treutler's case—he found it in a tumour about the size of a nut, which was connected with the left ovary.

Four instances are recorded of the discovery of the *H. venarum*; in one instance it was found in the blood which flowed from a ruptured anterior tibial vein; in two instances in the sputa brought up in hæmoptysis; and in a fourth instance in some venous blood. Dr. Cobbold regards these instances as authentic.

The *Tænia solium* may infest our bodies both in the adult and in the larva form. With respect to the symptoms referable to the abdomen in the former case we need say nothing, but would especially direct attention to the importance of keeping this parasite in mind when searching out the cause of some of the more severe forms of nervous disturbance. The *Cysticercus cellulosæ* is of comparatively rare occurrence in the human brain; nevertheless, Griesinger alone has collected fifty or sixty such cases, two of which came under his own observation. The symptoms observed have, however, not been sufficiently characteristic for diagnostic purposes; epilepsy, mental disturbance, signs of cerebral irritation, or torpor, either singly or conjoined, have been those observed. The origin of human tapeworm in the use of imperfectly cooked measled pork need be no further dwelt upon except to quote from Dr. Cobbold some less obvious modes in which the larvæ may gain access to the digestive canal. In badly measled pork,

> "there is danger even in the cutting up of the flesh. The knife employed by the butcher—it is sometimes even incautiously placed in his own mouth—is indiscriminately used to cut up any other meats at hand, and not unfrequently the vesicles are transferred from meat to meat, and from meat to mouth. This is one reason why so many butchers suffer from tapeworm. Cooks also, in like manner, will cut bread, cheese, and other foods with the same knives which they have just previously been employing to slice or chop up pork which may have contained a few or even many cysticerci; and thus, again, the mode of infection is accounted for." (p. 229.)

Dr. Cobbold also warns helminthologists and medical men against the danger which they run, in handling fresh tapeworms, of the eggs becoming concealed under the nails, or in the clothing; they may subsequently drop, or be brushed into our food, and being swallowed, become converted within us into cysticerci.

> "In like manner our neighbours, who complacently devour choice salads made from the stores of the market gardener, also run a certain amount of risk not only as regards this entozoon, but, indeed, as respects several others. The appropriate vegetables may be manured with night soil containing myriads of tapeworm eggs, or they may be watered with fluid filth, and other abominations, into which these eggs have been cast by various possible ways. In such cases one or more tapeworm ova may be transferred into our digestive organs, unless the vegetables are carefully cleaned before they appear on the table. In the same way one perceives how fallen fruits, all sorts of edible plants, as well as pond, canal, and even river water, procured from the neighbourhood of human habitations, are liable to harbour the embryos capable of gaining an entrance to our bodies. It thus becomes evident also how one individual suffering from tapeworm may infect a whole neighbourhood, rendering the swine measly, these animals, in their turn, spreading the disease far and wide. Such a person may even prove dangerous to the life of his friends and neighbours, and especially also to members of the same household. A case of this kind has come to my knowledge, and it may be explained as follows: one or more free proglottides, or joints with their eggs, had escaped from the canal either at night, voluntarily on their part, or during the day passively, in some such way, at all events, as secured the liberation of scores, possibly thousands of ova. One of these escaped eggs had somehow or other come in contact with human food, or possibly had been blown into the mouth, or even, perhaps, had been carried on the legs of some fly into the milk or sugar on the table; in some such manner, at least, the egg found its way to the stomach, and from thence it got into the circulation, ultimately making its passage to the brain, where its presence gave rise to convulsions and death. I offer this as a probable explanation in the case of a young woman whose sister suffered from tapeworm; but I need not say that, out of the sixty or seventy deaths recorded from the ascertained presence of this 'worm in the brain,' it is more than likely that a similar train of reasoning would afford a true solution of the so-called mystery as to how these entozoa become our brain guests." (p. 230.)

A similar idea seems to have occurred to Dr. Ogle, and although he adduces no case in which cysticerci have been traced in the human body to such an origin (a most difficult thing to do, by the way), yet his warning cannot be regarded as misplaced. He says:

> "In almost all cases there is reason to think that a tænia does not exist very long within the intestine without portions or joints being passed, not only by stool—i.e., with the fæces, but also by their spontaneously working their way through the anus and 'skedaddling' (to use an expressive Scotch phrase) from the person, adhering to the garments or falling on the ground. Now I have known cases in which there is reason to think that these fragments, which soon desiccate, shrivel, and become reduced to a small, brownish-coloured mass, may have been picked up by children, often crawling infants, who are ever ready to pounce upon and put in their mouth every crumb or crumb-like substance which they see, and then have been introduced into the digestive organs. I have no certainty of this, but I think it is a point worthy of consideration and attention, and one to be mentioned to parents in cases where the tænia is known to exist in any members of a family."[1]

In the number of the same periodical for April 4th, Dr. Ogle further remarks:

> "Will not the ovum of the tænia, under exceptional circumstances, hatch in the human bowel, and the resultant embryo pass into the hydatid, cysticercus, the larval, or scolex form in the human body, as it does in other of the vertebrata?"

Another possibility may be suggested—namely, that of the bearer of a tapeworm infecting himself with cysticerci. The wonder is, that considering the frequency of tapeworm, the cysticercal form of the disease in man is not more commonly observed. That it is observed in occasional instances, however, suggests, as we have said, the possibility of self-infection. Dr. Ogle informs us, that a tænia was once brought to him which had apparently undergone a process of digestion in the intestine. Had this process been sufficiently complete to have liberated the ova, there appears to have been no obstacle then to the infection of the system extensively with the larval disease. We have ourselves had tænia brought us with joints partially softened, but have been accustomed to regard this as the effect of maceration in water.

Some important statistics are quoted by Dr. Cobbold from Herr Wauruch, of Vienna—the more valuable because culled at a time long antecedent to our recent helminthological discoveries—from which it appears that out of 3864 persons treated at an hospital in that city, 206 were affected with tænia, and that the persons most affected were cooks, butchers, and other persons concerned with animal provisions. Professor Gamgee calculates that for every measly pig in the United Kingdom there is at least one human being with tapeworms, but supposing the proportion to be only one for every other measly pig, we should have 17,275 individuals thus affected, or 1 in every 2000 people. In confirmation of this, Dr. Haldane states that he has found a tapeworm three if not four times in the bodies of 2000 persons which he has dissected.

The *Tænia mediocanellata* is believed by Dr. Cobbold to equal in prevalence the *T. solium*. That we obtain the larvæ of this worm from imperfectly-cooked veal and beef may be accepted as established.

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[1] British Med. Journal, March 14th, 1863, p. 267.

"Drs. Barclay, W. T. Gairdner, and many others in this country, have published cases where their patients were disgustingly addicted to the habit of eating raw flesh; but of all the striking facts which have come to light on this score, none will bear comparison with those recorded by Kaschin. This professional observer, speaking of the Burätes, or Cossacks of the Baikal region, says: 'In Irkutsk, the Burätes stationed there as Cossacks, and who, in part, have been away from their homes for many years, are, almost all of them, infested with tapeworms; some individuals harbouring as many as fifteen specimens at a time. In 130 post-mortem examinations, only two bodies were found entirely free from these parasites, and among 500 other persons treated in hospital, the existence of these entozoa was demonstrated in all. Certainly, the presence of these parasites cannot cause surprise, when the habits of their bearers are duly considered. The Burätes are herdsmen, and feed almost exclusively upon flesh, especially that of calves, sheep, camels, and horses; they neither clean the meat of these animals properly, nor cook it completely; and, moreover, they eat from tables which immediately before have served for the purpose of cutting up the flesh. The tables are just as little familiarized with the application of water as are the dishes and the people themselves; in other words, they are never cleaned. Fat, liver, and kidneys are eaten quite raw, and diseased animals are as much relished as half-rotten carcasses. Moreover, these Burätes are so voracious that any two of them can demolish a one-year old lamb at a single meal.' (!) Kaschin supposes these tapeworms to be referable to *T. solium*, but in this, as Leuckart points out, he is evidently mistaken, for not only are the ruminants the principal source of their food, but they comparatively rarely partake of pork." (p. 241.)

The following is Dr. Brinton's reply to a question put him by the Chairman of the Special Committee on the Cattle Importation, &c. Bill:

"Do you believe that the habit of consuming raw meat exists to any extent amongst the population?—I do. Tapeworm is not uncommon, and, speaking roughly, I should say that 60 per cent. of the cases of tapeworm I have seen own to eating raw meat, and I suspect that of the remaining 40 per cent. a good many do it and do not own to it." (p. 58.)

As regards the frequency of this worm in our own country, Dr. Cobbold states that half the worms at the Middlesex Hospital belong to this species, and quotes Dr. Aitken, to the effect that amongst the soldiers at Fort Pitt it is more abundant than the *T. solium*. He believes that while the latter chiefly infests the poor who feed much on pork, the *T. mediocanellata* is met with mostly among the rich.

The *Tænia acanthrotrias*, *T. flavopuncta*, *T. nana*, *T. elliptica*, and *T. marginata*, are of very rare occurrence; respecting the last also, it may be stated that only one authentic and indisputable instance of its larva, the *Cysticercus tenuicollis*, occurring in the human body, is on record. We may, therefore, pass on to a much more important tænia, the larva of which is far more extensively distributed—the *T. echinococcus*.

Referring to Dr. Cobbold's book for the relative frequency with which *hydatids* infest particular organs, we shall confine ourselves here to the statistics of the disease, and the precautions which science appears to indicate as the only method of diminishing its frequency. The echinococcus disease is endemic in Iceland, where for every 100 inhabitants there are 1100 head of horned cattle, and every peasant has on an average six dogs. It is estimated that, at any one time, there are in the island 10,000 persons affected with echinococci, who are mostly treated by quacks, with whom such "remedies" as dogs' urine and fresh dogs' excrement play a conspicuous part. The disease is much more common in the interior than on the coast, and among women than among men; the latter circumstance being probably due to their more constantly drinking the water about their dwellings to which the dogs have access, and to their more implicit obedience to the dictates of the "quacks." Dr. Cobbold attributes the rarity of the disease amongst sailors to their being debarred from drinking water from localities where dogs abound, and its comparative rarity among our upper classes to the custom of drinking beer, where the poorer classes are under the necessity of drinking water. With respect to the advice to be offered as to the checking of the prevalence of these larval parasites he quotes with commendation the following remarks by Leuckart:

> "In order to escape the danger of infection the dog must be watched, not only within the house, but whilst he is outside of it. He must not be allowed to visit either slaughter-houses or knackeries, and care must be taken that neither offal nor hydatids found in such places are accessible to him. In this matter the sanitary inspector has many important functions to perform. The carelessness with which these offals have hitherto been disposed of, or even purposely given to the dog, must no longer be permitted, if the welfare of the digestive organs of mankind are (*sic*) to be considered." (p. 286.)

The precautions to be adopted in short are to ensure the destruction of all echinococcus vesicles, and the expulsion and annihilation of the tænia from the dog by timely physicking, as suggested by Dr. Leared, and burning of the excreta. Dr. Cobbold adds:

> "I again invite attention to the importance of observing this rule: *All the entozoa which are not preserved for scientific investigation or experiment should be thoroughly destroyed by fire, when practicable, and under no circumstances whatever should they be thrown aside as harmless refuse.* In the case of the *Tænia echinococcus*, the greatest difficulty likely to be experienced lies in the fact of the extreme smallness of this tapeworm. As an additional security, therefore, I would recommend that boiling-hot water be occasionally thrown over the floors of all kennels where dogs are kept, for in this way not only the escaped tapeworms, but also the little free embryos themselves, would be effectually destroyed." (p. 288.)

The *Bothriocephalus latus* is most frequent in West Switzerland and the adjoining French districts, and is common in the north-western and northern provinces of Russia, Sweden, and Poland. It appears to be most prevalent where the *T. solium* is rare. Dr. Cobbold expresses his strong persuasion that people infect themselves with this parasite by eating imperfectly cooked fish. The *B. cordatus* has only been found once in the human subject.

Warned by the length to which this article has already extended, we must pass over the other members of the Trematode group, to concentrate attention upon three of the most important of them.

The first of these is the *Trichina spiralis.* Although when we review the past literature of the profession, and although when each of us who has practised for many years looks back to his own experience and regards it by the light of modern investigation, we must hesitate to pronounce *trichinosis* to be a new disease, yet it is one of so recent recognition as to demand at our hands something more than a few cursory remarks. Its history, since the trichina spiralis was regarded as a mere curiosity of the dissecting-room, only dates back for a period of five years, since it was in January, 1860, that Zencker found the larval trichinæ as the cause of death in a young servant girl treated in the Dresden Hospital, and who exhibited symptoms similar to those which we shall presently describe. In that year Dr. Zencker recognised an epidemic of the disease in Dresden and its neighbourhood, and showed the existence of trichinæ in a ham and in pork sausages which the affected persons had eaten. Since then, numerous instances of the disease have been recognised in Germany, enough indeed almost to create a pork-panic; and especially in the kingdom of Saxony, and the Prussian provinces of Saxony, as in Magdeburg, Leipzig, Eisleben, &c. In the spring of 1862 thirty cases occurred at Plauen, in Saxony; and altogether there appear to have occurred in the place 80 cases, of which one was fatal. In Magdeburg, during 1858–62, 300 fell ill with the disease, and two died. In Calbe, near Magdeburg, during the summer of 1862, out of 38 persons attacked eight died; and in Blankenburg, out of 60 persons two died. From the end of October to the middle of December, 1863, about 158 persons were affected with the disease in Hettstädt, near Eisleben, and of these twenty-eight died. It can scarcely be imagined that the cases of disease recorded as happening in these places are all that have occurred. But what it is of chief moment to dwell upon is, that the mode in which the outbreaks of trichinosis take place is often calculated to raise a suspicion of foul play on the part of persons engaged in the preparation of the food partaken of. An instance or two of this may not be out of place. They will be found in Dr. Althaus's pamphlet. One such instance is described by Dr. Tüngel as occurring on board a merchant vessel trading between Valparaiso and Hamburg:

> "On leaving the former place the cook of the ship bought a pig, which was slaughtered, and part of which (about 30 pounds) was eaten by the crew; the rest of the animal was salted. Most of the crew fell ill, and two of them died. In a boy who died, and where an autopsy was made, numerous live trichinæ were found in the muscles. A piece of the salted pork was sent for examination to Professor Virchow of Berlin, who discovered in it a number of trichinæ, all of which were dead." (p. 10.)

Another:

> "In 1863 Professor Langenbeck, of Berlin, excised a tumour which had grown on the neck of a man. During the operation he noticed that the muscles which were laid bare contained a number of encysted trichinæ. The patient being questioned whether he had not at one time or another been affected with a remarkable illness, related the following history:—In 1845, a committee of eight gentlemen, being engaged in the inspection of schools in Saxony, dined together at an inn, and partook, amongst other dishes, of ham and sausages. They all, with the exception of one, who merely drank a glass of claret, fell ill, and four died. Suspicion fell upon the meal and the host. The wine from which they had drunk was analysed; and although no poison was found the host continued to be suspected, and was at last obliged to emigrate." (p. 7.)

The symptoms produced in man by trichina infection will depend for severity upon the number of parasites swallowed in the poisonous meal. Dr. Althaus distinguishes three stages in the distemper. The *first* lasts from four to eight days—i.e., until the first of the progeny are born. In this stage the symptoms are not distinctive, *malaise*, symptoms of indigestion, vomiting, and diarrhœa. The *second* lasts from the commencement of migration until the trichinæ have fully established themselves by becoming encysted in the muscles. Briefly, the symptoms in this, the most important stage, are—fever, sometimes high, the dryness of skin being succeeded by profuse perspirations, œdema of the face, with inflamed conjunctivæ, photophobia, and pain in moving the eyes, especially on looking upwards; scanty, high-coloured urine, diarrhœa, and tenderness of the abdomen; rigidity, swelling, and pain in the moving of the muscles, first of the neck and back, and proceeding to the arms and thighs, and next the forearms and legs; dyspnœa and hiccough arise in consequence of invasion of the respiratory muscles, and hoarseness and loss of voice in consequence of invasion of the laryngeal muscles; when the muscles of mastication and deglutition are invaded, these processes as well as that of speaking becomes impossible, and the patient lies on his back with his extremities slightly flexed, unable to move or speak. At last, with increase of the fever, there occur fainting fits and delirium, meteorism, hæmoptysis, lobular pneumonia, and pleural effusion, and finally death by exhaustion. A fatal issue may take place four or five days from the commencement of the illness, but it usually occurs during the fourth or fifth week. In other cases, however, recovery sets in about this period. This is the *third* stage, the symptoms all gradually lessening in severity, but stiffness and weakness of the muscles may remain for some time, and baldness and desquamation of the skin may succeed. In some insidious cases the characteristic symptoms are so slight that the patients are not even laid up, yet death may ensue in three or four weeks by pneumonia or peritonitis. Children, from their tendency to get rid of offending matters by vomiting and diarrhœa, are less apt to suffer than adults. The only absolute certainty attainable in the diagnosis of trichinosis lies in the discovery of the trichinæ in the evacuations or in the muscular tissues. To obtain a portion of the latter for microscopic examination, Middeldorpff's harpoon may be used, or an incision may be made near the lower insertion of the deltoïd muscle, and a minute piece of the flesh snipped off with scissors.

For full information as to the treatment of this affection we must refer our readers to Dr. Althaus' pamphlet; suffice it for us to say that an early emetic and calomel purge are not only rationally indicated, but seem practically to be efficacious in dislodging some at least of the trichinæ introduced in a meal, and the subsequent administration of sweet oil has been suggested. A desideratum is a substance which shall act as a poison to the trichinæ and not to man. Benzine has been suggested, and although poisonous both to trichinæ and man, yet has been given by Dr. Mosler in doses sufficient to destroy the trichinæ while within the intestine without damaging the person who has taken it. The grand object, however, to be attained is the prevention of the disease. *Thorough* cooking must kill the trichinæ in pork; but how rarely is pork, especially in the form of sausages, thoroughly cooked! More particularly, how prone are the poor to eat this and other meats more or less underdone! *Thorough* salting, again, seems to kill the trichinæ; but then it is to be kept in mind that many persons object to bacon and ham that have been thoroughly salted, and instances of infection by these preserved meats have been recorded, probably because bacon and ham are not saleable at a high price if too salt. It is a question of importance whether the State should not place itself between the pig-feeder and the public consumer, and demand from the former a guarantee that the meat supplied is not of a nature to originate disease.

The only other worm which we shall notice here is the guinea-worm, the *Dracunculus medinensis*, and we shall say very little about it. The "time-honoured" method of extracting the worm is as satisfactory as it is ancient; but now, perhaps, above all, the rule should be observed of not throwing away the worm to become the source of infection to others, but of consuming it entirely by fire. Prophylactically speaking, also, persons who travel in the districts infested by the larvæ of this worm should carefully protect the feet and legs during the rainy season, and after washing or bathing should take the precaution of drying their bodies most thoroughly by means (if possible) of warm or hot towels.

We must now conclude our notice of Dr. Cobbold's book; but before doing so we must express the obligation we are under not only to Dr. Cobbold, but to his publisher and printer, for presenting the profession with so really handsome a volume. People who regard books only from a strictly utilitarian point of view, may be content with the miserable blotting-paper and flimsy covering of the works which issue from the continental press; but good printing on good paper, attractive and artistic coloured illustrations, and an elegant and substantial binding, go far, in our observation, to popularize any subject, and especially such a subject as Dr. Cobbold discusses, in itself to some minds a somewhat repulsive one. In this instance also we can commend all concerned in the preparation of the work, inasmuch as the contents of the book are eminently worthy of the extrinsic attractions which have been thrown around it. The sixty pages of bibliography which complete the book are alone worth the purchase-money to anyone who would make himself familiar with the literature of the entozoa.

REVIEW IV.

1. *On the Two Forms or Dimorphic Condition in the species of* Primula, *and on their Sexual Relations.* By CHARLES DARWIN, M.A., F.R.S. ('Journal of Linnean Society,' vol. vi., Botany. 1862. p. 77.)
2. *On the Existence of Two Forms, and on their reciprocal Sexual Relation, in several species of the genus* Linum. By CHARLES DARWIN. ('Journ. of Linnean Soc.,' Botany, vol. vii. 1864. p. 94.)

3. *On the Sexual Relations of the Three Forms of* Lythrum salicaria. By **Charles Darwin.** ('Journal of the Linnean Society,' Botany, vol viii. p. 169.
4. *Observations on the Functions and Structure of the Reproductive Organs in the* Primulaceæ. By **John Scott.** ('Journal of Linnean Society,' Botany, vol. viii. p. 197.)
5. *On the Individual Sterility and Cross Impregnation of certain species of* Oncidium. By **John Scott.** ('Journal of the Linnean Society,' Botany, vol. viii. p. 162.)
6. *Notes on the Sterility and Hybridization of certain species of* Passiflora, *&c.* By **John Scott.** ('Journal of the Linnean Society,' Botany, vol. viii. p. 197.)
7. *On a Sexual Monstrosity, consisting in the Development of Polleniferous Ovules in two species of* Passiflora. By **S. J. A. Salter,** M.B., F.R.S. ('Trans. Linnean Society,' vol. xxiv. p. 143.)

In a former number of this Review (October, 1862) we drew the attention of our readers to the remarkable researches of Mr. Darwin on the fertilization of orchids; these have been followed up by a series of elaborate experiments on other plants by Mr. Darwin and others indicated at the head of this article. The results of these experiments are so curious that little apology is needed for again introducing the subject. It will be remembered that Mr. Darwin supplied the solution of what had long been an enigma to botanists—viz., the occasional production of two or three extremely different forms of flowers on the same plant among certain tropical *Orchideæ.* These differences were shown to depend upon the different sexual functions performed by the flowers in question. How little these functional differences were suspected, even by good botanists and keen observers, is shown by a paper of M. Duchartre on the polymorphism in the flower of certain *Orchideæ,*[1] wherein the author, after an examination of these peculiar flowers, considers them simply as accidental productions, freaks of nature independent of all laws and incapable of explanation!

It seems, however, that we have not to travel to the South-American forests to find illustrations of equal physiological importance to those just cited. The paper first mentioned in the list at the beginning of this notice is devoted to the two forms that occur in the genitalia of the common primrose. In the one form the style is so long that the stigma protrudes beyond the corolla; in the other the style and stigma are wholly concealed within the corolla. With the long style are associated (structurally but not functionally) short stamens; while on the other hand, in the short-styled flowers the stamens are either so long, or they are attached so high up, that they project from the mouth of the flower. The existence of these two forms in primroses, and indeed in numerous other plants—some of which will hereafter be alluded to—has long been known, but, as in the case of the *Orchideæ,* little or no attention was paid to them. We shall have to allude to the subject more fully under the head of *Lythrum;* hence at present we merely broadly state the results of Mr. Darwin's experiments on those two forms of primroses, and which are that, to ensure the most perfect fertility, the largest number of perfect seeds, it is necessary that the pollen from the short stamens of the one form should be applied to the short style of the other, and *vice versâ*. Thus the application of the pollen to the stigma of the same flower, or, as Mr. Darwin calls it, the "homomorphic union," is much less efficient in its results than is the contact of the pollen of one flower with the female organs of another flower, "heteromorphic union."

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[1] Bull. Soc. Bot. France, ix. p. 113.

Mr. Scott has confirmed and extended Mr. Darwin's observations on the species of primroses and of allied genera. He has experimented upon 54 of these, and of these 54, he finds 36 truly dimorphic, 5 monomorphic; while in the remaining 13 (dimorphic species) his means of observation have not been complete. Not only does Mr. Scott amply confirm all that his predecessor has published, but he shows that functional differences occur in certain of these plants, unattended by any appreciable change of structure—e.g., *Primula verticillata*, a monomorphic species, is more perfectly fertilized when the pollen from one flower is placed on the stigma of another, than when it falls upon its own stigma, although, as has been just stated, there is no structural difference in the male or female elements of the flower. Mr. Scott's tables also show that much greater fertility is obtained in some of these species by applying to the stigma pollen from a distinct species even, than by securing the action on the stigma of a flower's own pollen!

Mr. Scott shows this to be the case not only in *Primula*, but also in *Oncidium*, in *Passiflora*, &c. In *Oncidium*, it is shown that the male element of one species will fertilize the female element of two distinct species, and yet be completely impotent upon its own female organs; and, nevertheless, those very same female organs are fertile when pollen from another individual of the same species is applied to them, and also when pollen from a plant of another species is employed. Among passion flowers it is also shown that the pollen of one species is inoperative upon its own stigma, but abundantly fertile when conveyed to the stigma of another flower of the same, or even of different species. Facts of a similar nature have long been known to hybridizers and cultivators of plants; and in the works of Gaertner, Kolreuter, and others, detailed experiments are recorded in confirmation of them; for instance, one of the commonest cases is where the pollen of one species A, will fertilize B, while on the other hand the pollen of B will not fertilize A. Mr. Scott has gone beyond this, and has in the dimorphic primroses demonstrated that of the two forms of A, the pollen of one, but not that of the other, will fertilize B. But while heteromorphic unions are more productive than homomorphic ones, the curious fact comes out, that both are sometimes surpassed in fertility by the union which takes place in the monomorphic forms—i.e., those in which the pistils and stamens are of equal length in the same flower, so that here true hermaphroditism seems more potent than the diœcious or heteromorphic condition.

Similar results have been obtained in some species of *Linum* (flax), but we hasten on to the most curious and complex case of the whole series, that of the purple loose-strife *Lythrum salicaria*, so beautiful an adornment of our river-banks in late summer. *Three* forms of flower, then, are found on different individual plants of this species, differing one from the other, in the proportionate length of the styles and stamens, the size and colour of the pollen, and other minor points. Each form has one style of great, medium, or small length; there are thus three distinct kinds of style; there are, moreover, three distinct sets of stamens, corresponding in length to the three forms of style—long, medium, and short stamens. The individual flowers, however, only possess two out of these three sets of stamens, thus:

No. 1. Long-styled form has six medium stamens, and six short stamens.

No. 2. Mid-styled form has six long stamens, and six short stamens.

No. 3. Short-styled form has six long stamens, and six medium stamens.

In addition to these variations in size, there are other differences in direction, having special reference to the facilities afforded to insects in visiting the flowers, diversities in the colour of the pollen, differences in the number of seeds produced by each form, and in other points of more or less importance, but for which we must refer the reader to the original paper. When fertilization takes place naturally in this plant, it is effected in the following manner: the insects alight on the upper side of the flower, and insert their probosces along the upper and inner side of the calyx, because, owing to a peculiar deflexion of the base of the filaments, the nectar secreted around the ovary is more easily accessible from this side of the flower than from any other.

In immediate connexion with this arrangement is the upturning of the anthers and stigma, which are necessarily swept by the hairs on the lower surface of the insect's body, as it enters the flower in search of food. Incidentally Mr. Darwin remarks, that in most flowers whenever the stamens and pistils are bent, the direction of the curvature is towards that side where the nectar is secreted in greatest abundance, or where it is most easily accessible. We can confirm this by observation on the normal flowers of *Viola*, *Corydalis*, &c., where the styles are bent in the way just mentioned, but when these flowers become regular by Peloria, as they occasionally do, the nectar is as easily reached on the one side as on the other, and the style is then straight. In the case of *Lythrum*, Mr. Darwin shows that when bees visit the flowers, the green anthers of the long stamens of Nos. 2 or 3, or the long style of No. 1, as the case may be, come into contact with the abdomen and hinder legs of the insect, the medium stamens and the medium style brush against the under side of the thorax and the forelegs, while the short stamens and the short style rub against the proboscis and chin of the insect. Hence the bees would chiefly carry to the stigma of each form pollen from the stamens of corresponding length in another flower. Of course, they must also carry the other kinds of pollen also, but still they act not only as general carriers of pollen, but as special carriers of the right kind.

In the primroses and *Linums*, as we have seen, these structural variations correspond with diversities in function; and Mr. Darwin set himself to ascertain if this holds good in *Lythrum*. With this view he experimented on the relative fertility of these forms, and in doing so he had to fertilize No. 1 with its own two kinds of pollen, and with the two kinds of pollen produced respectively by Nos. 2 and 3. It was not sufficient to try on each stigma the green pollen from either of the sets of stamens producing it, although no perceptible difference in the pollen could be found, but it was necessary to try all six kinds of pollen on each stigma. More than two hundred experiments were made in this way, and with these results among others:

> "First: That as in structure, so in function, there are three female organs, for when all three receive the same pollen they are acted on most differently; and conversely the same holds good with the three sets of stamens. Secondly, only the longest stamens fully fertilize the longest pistil, the middle stamens the middle pistil, and the shortest stamens the shortest pistil."

These are spoken of as "legitimate unions." Of course, there are two such for each pistil. All the other "illegitimate" unions (four for each pistil) are more or less sterile, and the greater the inequality in length between the pistil and the stamens, the greater the sterility. Although the stigmas must be dusted over with each kind of pollen, yet the legitimate pollen is pre-potent and neutralizes the effect of the illegitimate pollen, even though the latter had been applied to the stigma some time before the legitimate pollen. A similar result has frequently been noticed by experimenters.

The mid-styled form has the highest capacity for fertilization, as it produces more seeds than the others; but, on the other hand, the potency of its two kinds of pollen is less than that of the corresponding stamens of the other two forms. The green pollen from the long stamens of the short-styled flowers No. 3, and that from the long stamens of the mid-styled flowers No. 2, is identical to all appearance, but its action is very different. So also, although the pollen from the short stamens of No. 1 and that from the short stamens of No. 2 is precisely similar, its effects are far from being the same, so that not only does *Lythrum salicaria* habitually produce three females different in structure and function, but also five kinds of pollen, differing in a marked manner in potency.

Such, then, are the principal results obtained at present from these researches. It is evident that similar observations must be greatly multiplied and extended in order to reconcile discrepancies, and especially to throw light on the fact that in some cases the structure and arrangements of the flower are such as to promote cross-fertilization, and check or neutralize self-impregnation; while in other cases—in the same species even—equally stringent means are taken to secure close breeding, and to prevent cross impregnation. Of this latter class are such instances as those afforded by species of violet, of balsam, wood sorrel, &c. &c., wherein some of the flowers—the ordinary ones—are adapted to insect agency and cross fertilization, while on the same plant are produced other small flowers whose development in some points appears to be arrested, which never open, and yet they are very prolific, sometimes more so than are the ordinary flowers.

Why all this complexity in sexual arrangements in a single species? Why are some species so endowed, and others not? These are questions urgently demanding solution.

Again, one of the most important subjects raised by these researches is of course the question of species. Of all the tests proposed for the discrimination of species, those founded on sexual differences, such as are above detailed, are esteemed by physiologists as the most searching and the most satisfactory. It is quite evident that in the present state of our knowledge those physiological tests are of no higher value than the structural ones.

Have these variations in the sexual organs any relation to the variation that takes place in other organs of the plants—e. g., in the arrangement of the leaves, the form of the stem, &c.? Does cross breeding tend to promote these variations, and close breeding on the other hand check variation? On a first consideration, the answer to this question would probably be an affirmative one; but the opposite view, that close breeding favours variation, while cross breeding tends to restrain it, has at least as much evidence to support it. "Crossbreeding," says Professor Asa Gray,[1] "keeps down variation by repeated blendings; but while close breeding tends to keep a given form true, in virtue of the ordinary likeness of offspring to parent, it equally and in the same way tends to perpetuate a variation once originated from that form, and also along with selection, natural or artificial, to educe and further develop and confirm the said variety."

On the other hand, free crossing of incipient varieties *inter se* and with their original types is just the way to blend all together, to repress salient characteristics as fast as the mysterious process of variation originates them, and to fuse the whole into a homogeneous form.

Not only are there variations in form, which may possibly be accounted for by sexual peculiarities, but there are variations in constitution so to speak, which are at present wholly unexplained, but which may perchance be dependent on the same peculiarities in sexual function. For instance, *Lythrum salicaria* naturally occurs in wet places, and yet it flourishes equally well and is equally fertile in dry garden soil. There are numberless instances of this kind; and on the other hand there are cases of a different kind, not without value in such a matter. For instance, Nolte of Copenhagen says that *Stratiotes aloides* produces hermaphrodite flowers only between 52° and 53° north latitude, north of that female plants are alone met with, south of that males alone. This plant increases rapidly by offshoots, and it may, like the hop, hemp, and other diœcious plants, occasionally produce male and female flowers on the same plant. Knight, an accurate and careful observer, noticed that a high temperature favours the formation of stamens; a low one that of pistils. Some of the *Caryophylleæ*, diœcious in America, are not so in this country. Among facts of this nature may also be mentioned that of a willow, *Salix repens*, growing partially under water; the blossoms produced above the water were female, while those twigs that had been under water and produced flowers, when the water was dried up, produced only male blossoms.[1]

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[1] Journal of Botany, vol. i. p. 147.

We have lingered so long over these points that we can do little more than mention the very singular case recorded by Mr. Salter. The most important circumstance here is the accidental production of pollen within the *ovules* of a kind of passion-flower. The pollen appears to have been formed in the nucleus of the ovule, possibly in the embryo sac itself:

> "For an ovule to develop pollen within its interior," writes Mr. Salter, "is equivalent to an ovum in an animal being converted into a capsule of spermatozoa. It is a conversion of germ into sperm, the most complete violation of the individuality and unity of sex; and it involves the idea of a mutation of gender."

The bearing of this case upon parthenogenesis, or virgin reproduction in flowering plants, is obvious and important; and it must certainly be borne in mind as a possible source of fallacy, to be carefully examined in any future case of the kind that may come under observation. As to the existence of parthenogenesis or not, although new cases of the kind have been lately recorded by Mr. Hanbury in '*Xanthoxylum*,' and by Dr. Anderson in '*Aberia*,' &c., yet the general tendency is towards disbelief in so flagrant an exception to the ordinary rule in flowering plants.

Those of our readers who take an interest in this matter will do well to peruse Karsten's elaborate paper on the subject in 'Ann. des Sc. Nat.,' iv. sér. xiii. p. 252. We have trespassed so much already, that we forbear from pointing out the important bearings some of the facts and speculations we have noticed have upon animal physiology, upon the good or bad effects of consanguinity on the reproductive powers of animals—upon the perpetuation of certain diatheses and hereditary diseases, &c. &c. In conclusion, we must express our hope that the impulse given by Mr. Darwin to the subject may wax stronger and stronger, and lead to the elucidation of much that is at present mysterious or unknown.

REVIEW V.

1. *Report of the Commissioners appointed to inquire into the Condition of all the Mines in Great Britain to which the provisions of the Act 23rd and 24th Vict. cap.* 151, *do not apply; with reference to the Health and Safety of Persons employed in such Mines. With Appendix.* Presented to the Houses of Parliament by order of Her Majesty—*London,* 1864. 8vo.
2. *Epitome of Evidence taken before the Commissioners.* (Appendix B.)
3. *Copy of a Letter to Captain Charles Thomas, Dolcoath, Camborne, from the Right Honourable Lord Kinnaird, Chairman of Mines Commission.*

THE unsatisfactory sanitary condition of the mining population of this country has long received the anxious consideration of statesmen and philanthropists. From the frequency of accidents, involving great loss of life, arising in coal mines, and resulting from the explosion of gases, the influx of water, or originating in other ways, public attention has chiefly been directed to the state of such mines, and legislative enactments have been for many years enforced, in order to give to the men employed in them as much protection as is compatible with their occupation. The condition of the tin, copper, and lead miners not less demands practical consideration; and it has been shown by medical men residing in the mining districts, by the reports of the Registrar General, and by a memoir by Dr. Headlam Greenhow, published by the medical officer of the Privy Council, that the occupation is one which very seriously impairs the health and shortens the duration of life in the men who follow it.

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[1] Linnea, xiv. p. 367.

With the object of collecting information upon which regulations might be introduced, calculated to lessen the injurious influence of the occupation, a Royal Commission was issued in 1862; and the report was published during the last autumn. This commission was very carefully constituted. The chairman, Lord Kinnaird, is well known as foremost in every work having for its object the improvement of the condition of the working classes. The members of the Commission included gentlemen interested in mining property, and well acquainted with the practical working of mines in all its details—scientific men, and members of the medical profession, whose previous researches specially fitted them for the proposed investigation. In the course of their proceedings the commissioners visited all the mining districts in England and Wales, took evidence as to the mode of working the mines from the proprietors, agents, and labourers; examined medical men in different parts, as to the effects of the employment upon the health of the men, and the forms of disease to which they are subject, and themselves descended in many of the mines in different districts. They further employed engineers to report upon the modes of working the mines; chemists to analyse specimens of air from various mines in different parts of the country; and medical men to investigate the state of health of the miners, and to report upon the diseases which prevail amongst them. The results of the labours of the Commission are contained in the works named at the head of our article. They embrace an octavo volume, including the report, conclusions, and recommendations of the Commissioners; and two thick folios, one containing the evidence taken, the other the reports referred to. In these volumes will be found a mass of information on matters relating to mining in all its different branches, certainly exceeding in importance and interest any previous work, and which very fully attests the earnestness and ability with which the Commissioners, and especially their chairman, devoted themselves to the completion of the work devolved upon them. It would be beside the purpose of a medical journal to dwell upon matters referring to the economy of the mines, but we propose to give a brief abstract of the medical evidence adduced, believing that the information collected will be well worthy the attention of the profession.

In reference to the duration of life among miners, and the diseases of which they die, much valuable information was laid before the Commission by Dr. Farr, of the Registrar General's office. That gentleman had previously prepared tables showing the high rate of mortality among miners for the years 1849 to 1843 inclusive. He has since compiled others, specially for the Commission, recording the mortality among the miners during the years 1860 to 1862 inclusive. From these it appears that, after twenty-five years of age, when only the influence of the occupation upon the health of the men could be supposed to show itself, the rate of mortality among miners is very much higher than in the male population at the same ages, who are employed in other occupations, and this excess becomes more marked with the advance of life. The following table, taken from the report, shows the annual death-rate at different ages in 1000 miners employed in certain Cornish districts, and in 1000 men residing in the same localities, but following other occupations, calculated from the deaths registered during the three years named:

	Deaths in Miners.	In others.
From 25 to 35 years of age	9·57	8·32
„ 35 to 45 „	15·12	10·08
„ 45 to 55 „	29·74	12·50
„ 55 to 65 „	63·21	19·96
„ 65 to 75 „	110·51	53·31

The great loss of life which is thus shown to occur among the Cornish mining population, is further proved, by other similar tables, not to be due to any circumstances which operate unfavourably upon the Cornish miners alone; but to be referable to causes which equally affect the metal miners in all districts, since it occurs to an equal or even greater degree among the men employed in lead mines in the North of England and in Wales, though their condition is in various respects different from that of the Cornish men. The Commissioners, however, remark that it is not the working under ground which is necessarily destructive to life, for they state that the ironstone miners of Cleveland, and the hæmatite iron miners of Furness, do not suffer materially from their occupation, while the coal miners in the North of England, if the deaths from accident be excluded from calculation, are proved to be eminently healthy. The latter fact is shown in the following table, embracing the period from 1849 to 1853, in which the death-rates from all causes among the Cornish miners, and among the coal miners of the North of England, are compared:

	In Cornwall.	In the N. of England.
From 25 to 35 years of age	8·96	8·49
„ 35 to 45 „	14·30	10·13
„ 45 to 55 „	33·51	16·81
„ 55 to 65 „	63·17	24·43
„ 65 to 75 „	111·23	65·16

In reference to the facts recorded in this table, the Commissioners say that the mortality among the Cornish miners is shown by it to have been almost as much in excess of the rates which prevail among the coal miners in the districts of Durham and Northumberland, as they were above the rates prevailing among the non-mining male population of Cornwall.

Dr. Farr's tables also illustrate the causes which conduce to the high rate of mortality among the mining population, and prove that it is mainly due to the excessive prevalence of different forms of disease of the respiratory organs. We quote the table exhibiting the rates of mortality from pulmonary diseases in the Cornish districts for the period 1860 to 1862:

	Metal miners.	Others.
From 25 to 35 years of age	4·15	3·83
„ 35 to 45 „	7·89	4·24
„ 45 to 55 „	19·75	4·34
„ 55 to 65 „	43·29	5·19
„ 65 to 75 „	45·04	10·48

In this case also the rule which applies to Cornwall is equally applicable to the other mining districts; indeed, the similar table for the North of England shows that the rate of mortality is higher from pulmonary diseases in the lead miners of the north than in Cornwall, and this, too, to a greater extent than is explained by the greater prevalence of pulmonary diseases in the general population.

Having thus illustrated the great loss of life which is occasioned by work in the metal mines in different districts, the Commissioners proceed to report upon the state of health of the men, and the diseases under which they suffer. On this point they say:

> "It may be affirmed, as a general proposition, that the health of the tin, copper, and lead miners, as a class, is generally inferior to that of labourers engaged in agricultural and other open-air occupations. At a comparatively early age the miners almost invariably exhibit in their features and persons the unmistakable signs of debilitated constitutions. Their faces are sallow; they have an anxious expression of countenance, and their bodies are thin. At the border of middle age, or soon after, their health begins to fail; the maturity and confirmed strength of that time of life seems to be denied to them; they rapidly acquire the feebleness of declining years, and become unfit for laborious work at a time when their experience and skill would otherwise have made them valuable workmen."

On referring to the evidence brought before the Commission, there is ample proof that the account given in the report of the state of the Cornish miners is not overcharged. Dr. Peacock, who, in conjunction with Mr. Bankart, reported upon the state of health of the Cornish men, says:

> "In examining even casually a large number of miners, it is impossible not to be struck with the peculiarly delicate appearance of many of them, and especially of the older men, and of the boys and young men who have worked under ground only for a short time. Instead of having the bright and clear complexions of the young people employed at the surface, those who labour in the mines have a pale, sallow appearance, which they appear to acquire even after having worked under ground only for a few months. The middle-aged

> men are less unhealthy-looking, but those who have long worked in the mines, and are verging towards old age, have a peculiarly old appearance. . . . . . Many of the young and middle-aged men are healthy and robust-looking. Some also are seen, even at advanced periods of life, who state that they have been miners all their lives and are still going underground, or have only recently ceased to work below, who nevertheless are hale and strong and free from appearances and symptoms of disease. Comparatively few men are, however, found at work who have much passed the middle period of life, and still fewer who under such circumstances appear and report themselves to be in good health."

He finally concludes by saying, that—

> "I do not hesitate to assert that the condition of the mining population is much less satisfactory, in a sanitary point of view, than that of men employed in laborious occupations out of doors—as masons, stone cutters, farm labourers, fishermen, &c.; that their capacity for labour is exhausted at an earlier period of life, and that their health also fails at an earlier age."

In proof of the correctness of this statement, the results of the examination of several hundred men are referred to, and we have no doubt that the facts fully bore out the conclusions drawn from them; but the investigation would have been more complete had an examination of men at similar ages, and following similarly laborious occupations on the surface, been also instituted for comparison.

The period at which the health of the Cornish miner fails is said to be from thirty to forty, and at from forty to fifty their powers become so seriously impaired that, in most instances, they are no longer able to continue their occupation. The Commissioners say it is a common remark in Cornwall that a "person of fifty is old for a miner;" and we observe that a table appended to one of the medical reports gives the mean age at which the health failed in 48 men, permanently disabled, as forty-three, and the extremes of age as twenty-one and sixty-six. The period of work before the failure of health was in the same cases on the average 28·5 years, and the extreme periods five and fifty-three years. Similar calculations are given as to the actual state of health and the time of life at which the health fails in the lead-miners in the North of England, from which it appears that the men generally look more healthy than the Cornish miners, and work for a longer period; but if this be the case, it does not appear that their lives are more prolonged, for we have already said that Dr. Farr's tables show the rate of mortality to be even higher in the North of England than in Cornwall.

In reference to the diseases prevailing among the miners, the Commissioners express their regret that "medical gentlemen connected with the mines have not directed their attention to a special investigation of the causes and nature of the 'miners' disease' by examining the localities and the air in which the men work, and by endeavouring to get an insight into the disease by post-mortem examinations;" and they further state that in consequence of this, "hasty, and in many instances erroneous, returns of the cause of death have been made to the district registrars." They therefore desired to have the subject reported upon more fully by medical men, who should enter upon the investigation without prejudice from previous ideas. It was on these grounds that the gentlemen named were requested to visit the mining districts. The reports which they made will be found to give more or less extended statements of about 230 cases of different forms of disease which they examined among miners in Cornwall, and of 25 cases observed in Cumberland, Northumberland and Durham. These cases are classed under the heads of—1. General debility, indigestion, rheumatism; 2. Slow fever; 3. Diseases of the respiratory organs; 4. Diseases of the heart and circulating organs; 5. The affections of the nervous system; 6. Dropsy and disease of the kidneys, &c.; and 7. Diseases of the skin, scrofula, &c.

Of the various affections, the 2nd, 3rd, and 4th, seem to be those to which the miners are more especially prone. Under the head of "*slow fever*"—a term often employed by the miner—we are told that he includes two forms of disease, one the usual enteric or typhoïd fever, which prevails extensively from defective sanitary regulations in the Cornish towns and hamlets; the other, a form of affection which is clearly due to the employment of the miner. The disease appears to commence gradually after the miner has been working underground for some years. "It generally occurs after he has been employed at a close end where there was very imperfect ventilation or great heat, or when he has been working at tribute for some time at a scarcely remunerative rate, so that he has not been able to obtain an adequate amount of wholesome and nutritious food. The patient's appetite first fails; often he experiences an entire repugnance to food, and the little which he takes does not agree with him, giving rise to sense of distension, weight, or pain, or being followed by retching and vomiting. There are frequently colicky pains in the abdomen; the bowels are confined, and the patient not unfrequently has piles, passes blood by stool, and has pain or tenderness in the region of the liver. He usually also suffers from headache, dizziness, and depression of spirits, rapidly loses flesh, and soon becomes so prostrated as not to be capable of continuing his work. The failure of power is sometimes first experienced in the arms in striking; more frequently, however, there is weakness in the loins and lower extremities, especially experienced in ascending the ladders; usually there are pains in all parts of the body, and especially in the back and limbs. With these symptoms there is generally some shortness or difficulty of breathing, but rather from weakness than active affection of the chest. Marked feverish symptoms are also experienced, burning heat in the palms of the hands and soles of the feet, aggravated toward the after part of the day, with extreme restlessness at night, so that the patient obtains no sleep and rises in the morning less refreshed and more prostrated than when he went to bed at night." It is added, this form of affection is "very aptly termed 'slow;' it prostrates the patient, and renders him altogether unfit for work, without being at any time seriously ill. He is rather out of condition than ill, and is proportionately long before he recovers his health and vigour."

It appears however, that in accordance with the observations of

Dr. Farr, before quoted, affections of the chest are those to which the miner is especially subject, and which generally lead to his being incapacitated for work, whatever may have been the mode in which his health first failed. Of these diseases true tubercular phthisis occurs among the miners as among the non-mining population, and chiefly in persons who are predisposed to the disease. But the pulmonary affections which are more common among the miners, and which indeed seem to be the result of their occupation, are forms of bronchitis, with emphysema and consolidation of different parts of the lungs, ultimately leading to disorganization in most cases sooner or later. These affections are so well known in all the mining districts that they are called "miner's disease," "complaint," "asthma," or "consumption," and they are so frequent that they constituted in Cornwall 41 out of 83 cases reported upon by Dr. Peacock, and 90 out of 150 cases collected by Mr. Bankart. In the North of England the asthmatic affections are less complicated than in Cornwall, but they are equally prevalent, constituting 18 out of the 25 cases examined by Dr. Peacock in the Northumberland and Durham lead-mining districts. It is by these forms of affection that the labourer finally becomes incapacitated for work, and it is stated that there are few miners at the age of thirty-five or forty who do not suffer, more or less, from difficulty of breathing. The asthmatic affections become in a few years so severe that the miner is no longer able to work underground, and sometimes is entirely unfit for any kind of work; but not unfrequently, after giving up mining for some months or years, they recover partially, and are able to do some light labour at the surface in fine weather, and when free from cold. Men were seen who had been thus laid by for from twelve to twenty or twenty-five or twenty-six years.

Diseases of the circulating organs are stated to be of frequent occurrence in Cornwall, but rare among the miners in the North of England. It appears, however, that the forms of cardiac disease which are met with are not generally caused by rheumatism, but are apparently the result of over-exertion, and are combined with affections of the lungs. They generally assume the form of incompetency of the mitral valves, resulting from dilatation of the left ventricle; but occasionally aortic valvular defects are met with.

The account given of the different forms of disease among the miners is very full, so far as the observation of the cases during life is concerned. The reporters were, however, only able to obtain one post-mortem examination, and thus their remarks upon the pathology of miner's disease are unavoidably defective. In this instance the lungs were consolidated and broken down in places, and the bronchial tubes were dilated, but there was no tubercle in any part. The lungs are reported to have been very dark-coloured, and the dark material proved, on chemical examination, to be carbonaceous. This observation throws light upon the black spit which the men state is so common among them when suffering from colds, and which indeed often continues for many years after they have ceased to work underground. We observe also, as noteworthy in connexion with the sallow and dingy complexion said to be universal in the old miners, that one of the supra-renal bodies in this case was entirely destroyed, being converted into a cyst, while the other was atrophied and consisted of little more than cellular tissue.

In reference to the occurrence of scrofulous affections among the miners and their families, they are said to be decidedly rare. One of the medical reporters states that he visited some schools in one of the chief Cornish mining districts, and examined a large number of children, most of them those of miners, and writes that he had "certainly never seen a more healthy set of children collected together, and did not detect a single child with swelled glands or other sign of scrofula," an observation of importance, as bearing upon the asserted hereditary tendency to disease in miners.

Having thus given a brief account of the state of the mining population, it remains to consider the causes to which their defective sanitary condition is assigned by the Commission.

In reporting on this branch of the subject, the Commissioners refer to the state of many of the cottages in all the mining districts as being very defective, and the medical men often speak of the prevalence of fever in them. It is, however, remarked, that this cause cannot explain the state of the miners, for their wives and children are remarkably healthy-looking, and form, indeed, a striking contrast to the men. The first circumstance to which they allude as operating unfavourably upon the health of the miners is the want of any mechanical means for conveying the men to and from the underground workings. At present, the Commissioners say, that in Cornwall the almost universal mode of entering and leaving the mines is by ladders, "some of which are perpendicular, and few much inclined." When, therefore, the great depth of many of the mines is considered—from 200 to 300 fathoms—it is at once obvious how great must be the exhaustion of the men occasioned by climbing. Indeed, we are told that there are mines where the men spend three hours a day in this way. On returning from their work they reach the surface perspiring profusely and much exhausted, especially when they have been working in close places. In this state, if the house provided for changing their mining clothes be not near at hand, the men are very apt to get chilled, and suffer from serious illness in consequence. The older men, indeed, are often incapable of undergoing the labour of the ladders, and can only work in mines where some other means of access and egress are provided. This, however, in Cornwall, is quite the exception, though in some few mines what is called a man-engine is at work, and in others, the men are drawn up and let down by a skip. When underground the men work with heavy hammers, continually striking the "borer" to form the bores for blasting, and this, too, is hard work. Altogether, the labour which the men have to undergo is severe, and the medical men ascribe to it—and especially to the ladder-climbing—the prevalence of cardiac affections among the men. In the North of England the mines are generally entered by day or horizontal levels on the sides of the hills, and from them the men ascend or descend to other workings by ladders, or what are termed "stemples"—staples driven into the rock in the sides of the shafts; but the vertical shafts are not generally deep, and the labour of climbing does not appear to be materially injurious to the men. The absence of much climbing is thought by Dr. Peacock to explain the comparative rarity of disease of the heart in those districts. Sometimes in the North, and in Wales, the mines are entered by vertical shafts, but the depth is not generally great, and often skips are provided to send down and raise the miners.

The next subject reported upon is the ventilation of the mines, and though the Commissioners state that they had proof that there has been an improvement in this respect within the last few years, it is evident that many of the mines are still very defective. The work in the mines is done by two different sets of labourers—the tutwork men, who are employed in driving the new shafts and levels, and the tributers, who get the ore. The former are consequently most exposed to work in bad air, while the latter, chiefly working in places fully opened up by different shafts and levels, may suffer but little in this way. If, however, we are to judge from the reports of the men, there can be no doubt that in all mines there are places in which the ventilation is very defective. The men say that often the candles can only be got to burn when held on one side, or when the wicks are kept constantly teazed out, and sometimes that they will not burn at all in the places where the miners are at work, but have to be placed some distance behind them. When working in bad air they complain of suffering from dizziness and headache, failure of power in the limbs when beating the borer or ascending the ladders, loss of appetite, and sickness and vomiting, with shortness of breath, palpitation of the heart, &c. These evidences of defective air are met with among the miners employed in all districts, and perhaps to a greater extent in Northumberland and Durham than in Cornwall; and, indeed, the men everywhere give very much the same account, it being a common remark, that "all miners have to breathe bad air more or less," or that "in all mines there are bad places;" and if we turn to the evidence afforded by the analysis of the air of the mines, there is ample proof that the reports of the men are not overcharged.

The investigation of the chemical qualities of the air was undertaken by Dr. Angus Smith and Dr. Bernays. The former gentleman examined no less than 328 samples of air, removed in hermetically sealed tubes from the workings of different mines. In reporting upon the analysis of these samples, he states that he regarded as normal all the samples containing more than 20·9 per cent. of oxygen, as impure those in which the proportion ranged from 20·9 to 20·6, and as decidedly bad all in which the last figure was not attained. Of the whole of the samples only 10·65 per cent. were normal, 24·69 were impure, and not less than 64·3 per cent. were decidedly bad. These samples were removed from mines in different parts of the United Kingdom, and those from the North of England and Wales were even worse than the Cornish samples, yet of the latter, not less than 87 contained less than 20 per cent. of oxygen, and 11 less than 19 per cent., and in 1 the proportion was only 18·27. He further remarks, that the air from some of the workings could not be analyzed from the candles not burning sufficiently well for the tubes to be sealed. Dr. Bernays also made analyses of air from mines in different districts. In Cornwall he found specimens varying as to the proportion of carbonic acid from nearly the healthy standard to 0·65 and 0·846 per cent., and from one mine in the North of England he analyzed air containing not less than 2·238 per cent. of carbonic acid. He remarks that it was scarcely possible that persons could have been found capable of living, still less of following a laborious occupation, in so impure an atmosphere. It must further be remembered, that the air of mines thus proved to be deprived of its proper amount of oxygen, and surcharged with carbonic acid, is still further depraved by the offensive exhalations from the lungs and skin of the men at work, by the combustion of their candles and by the explosion of gunpowder. The workings also in all the deep mines become hot, varying from 80° to 90° Fahr., and in some the temperature of certain parts exceeds 100°, and even amounts to 110°. The labour in these hot places is attended with great exhaustion, the men work nearly naked, and yet have to leave the close ends and go into the levels and throw water over themselves every few minutes. The effect is also to render the miners very susceptible to cold on reaching the surface. In the North of England the mines are not hot, though even after working in some of them the men are very apt to take cold.

The defective ventilation also causes the atmosphere of some of the mines to be very dusty. This, in dry mines, the men state is very prejudicial to them. The Cornish mines do not, however, appear to be very objectionable in this respect; but in the North the loose shales throw off much dust in boring and after explosions, and the men complain much in consequence. It does not appear that there is reason to ascribe much evil to the inhalation of gritty particles in Cornwall, but in the North of England the men appear to suffer considerably from this cause.

In Cornwall the great complaint is of "cold damp," apparently air loaded with carbonic acid, and chilled and very moist from passing through the workings. In the North the men generally class together as causes of their indisposition "bad air, powder reek, and stour." It appears, however, that the causes which have been mentioned as producing the sickness among the men—too violent muscular exertion and defective ventilation—rather act as predisposants to disease than give rise to it. They apparently impair the general health, and give rise to a cachectic state of system, in which serious and prolonged illness supervenes on the occasion of any exciting cause—sudden chill, or accidents, often even when such causes are very slight. The medical men also appear to think that the Cornish miners do not get a sufficient amount of wholesome and nutritious food for men following so laborious an occupation.

The exciting causes of disease in the miners are thus enumerated in one of the reports:

"Some of the men ascribed their illness to the exposure to 'cold-damp' in the mine, others to having been chilled on resting in a cold and damp level, after they had been working in a hot and close end and when perspiring freely; and yet others to their having had to pass through cold water on leaving the place at which they had been working. Some blamed as the cause of their indisposition the cold draughts to which they were exposed in the shafts when wearing their wet underground clothing. Another said he had taken cold from having to wait in the shaft till the time for leaving the mine. One traced his attack to exposure to cold and damp on reaching the surface, from having to go through the rain to the changing house; another to having had to wash in cold water; and yet others to having put on the clothes in which they had walked through the rain to the mine, and which had not been properly dried. One man ascribed the failure of his health to having gone to work in a cold mine in the granite, after having long worked in a warm one in the killas; another, who suffered from symptoms of angina pectoris, referred his illness to having been employed in repairing the shaft of a mine which had been abandoned, and was being re-worked—'forked out'—and in which the cold water came down upon him and kept him constantly wet. A third, who was paraplegic, said that the symptoms had rapidly come on after he had been working with his legs in cold water, owing to the drainage of the level being obstructed by 'attles,' or 'deads.' And a fourth referred his illness to having taken cold from having been employed in repairing the neck of the shaft, when he had been accustomed to working in warm levels underground."

There are various other subjects discussed in the report, all of great interest, but we have only space to allude to the frequency of accidents among the men. These consist of injuries in blasting, falls from ladders, falling from one level to another, falls of rock, and bursting of boilers, &c., and entail a very great increase to the rate of mortality, in all the mining districts, but especially in Cornwall.

Of the conclusions arrived at by the Commission it is not necessary to speak, as they are indicated in the remarks which we have previously made. The suggestions and recommendations which have special reference to the improvement of the sanitary state of the miners, are—

1st. That some system of improved ventilation of the mines should be introduced.

2nd. That all mines should have proper houses in which the men can change and dry their clothes.

3rd. That mechanical means of access and egress should be provided, in the place of the ladders, where the mines are deep.

4th. That, "as a general rule," no boys under the age of 14 should work below the surface.

And 5th. That the system of mine clubs should be modified, so as to allow of help being extended in cases of sickness as well as of accident.

There are doubtless great difficulties in carrying out any system of ventilation in deep mines sunk in rocky strata. In the coal mines, however, it is well known that the ventilation by means of exhausting furnaces is often most perfect, and the superior healthiness of the men in consequence has been shown. There seems, therefore, every reason why this system should, if practicable, be tried in the metal mines. In some of the mines of Mr. Beaumont, in the North of England, the system has been introduced, and has been found to work well. In Cornwall, where much fuel is consumed by the pumping and drawing engines, there would appear to be little difficulty in rendering the furnaces available for producing by exhaustion an upcast current from the lower workings, while fresh air might be introduced through boxes or tubes, receiving their supply direct from the surface. There can be little doubt that this plan would at least be a great improvement upon the mere accidental ventilation, which may be said to be all that takes place at present.

The requirement that proper drying-houses should be attached to all mines, and that they should be sufficiently large to receive the clothes of all the men employed, and be properly provided with warm water for washing, and even for bathing, would doubtless contribute both to the comfort and healthiness of the miners. Such houses should also be placed so close to the shafts by which the men leave the mines, that they could at once reach them without exposure to the external air, when exhausted and in their wet clothes.

Man-engines or skips should also be attached to all deep mines, to convey the men to and from their work. The skip, of the two, would probably be the best, for it would convey the men more rapidly up to the surface, and so expose them for a shorter time to the cold draughts which are felt in the shafts, and which the men say often give them colds and so lay the foundation of serious illness.

The restriction as to the age at which the boys are to work underground should, we think, have been peremptory; the terms employed by the Commission would enable its intention to be entirely evaded. We think also that the age of 14 is too early, and that the boys should not be allowed to work underground before 15 or 16. The Commissioners quote the remarks of one of their medical men upon the injurious influence which probably results from the boys being allowed to commence work so early as at present. We observe, however, that that gentleman fixes the age which we have named as the earliest at which the boys should be allowed to go underground, and speaks with approbation of the plan adopted in the London Lead Company's mines in the north. In these the boys only begin to work underground regularly when 18 years of age; but are allowed, after the age of 14, to work during winter for about three months—work at the surface being during this time not carried on from the rigour of the climate. They are thus kept in constant work, and get gradually inured to the atmosphere of the mines. We believe that no legislative enactments which can be introduced would be more beneficial than a restriction as to the age at which the boys begin to work underground. At 16 or 18 they will probably be young enough to make good miners, while their strength will be so far established as to resist to a considerable extent the injurious influences to which they must necessarily be exposed; and we think that a regulation of this kind would materially prolong the period of labour of the miner.

The subject of the mine-clubs is one which imperatively demands some alteration. At present the men generally only receive pecuniary assistance when suffering from a "visible hurt;" and in some mines they are only entitled to the assistance of the doctor under similar circumstances. We see with much pleasure that Lord Kinnaird has devoted himself to this subject; and by the assistance of Mr. Tidd Pratt and Mr. Brown, a scheme of a miner's club, to provide for medical relief in sickness and accident, and for annuities at certain periods of life, has been drawn. We sincerely hope that this plan may be carried out. In the London Lead Companies mines, and in those of Mr. Beaumont, well-arranged clubs are in operation, and are productive of much benefit to the miner. We cannot but think that a club embracing the men in different districts, and which would allow them the choice of different medical men, would be far preferable to the present clubs attached to particular mines, and to which there is generally only one doctor.

In concluding our analysis of the report, we cannot but feel that the country is very greatly indebted to the Commission, and especially to the chairman, Lord Kinnaird, who may safely be said to have been by far its most active and earnest member, for the investigations which they have carried out. Their report, and the evidence adduced, contain ample materials on which to base legislative enactments having for their object the improvement of the condition of the miners. The mining interest is too important to be injured by unnecessary interference; but we believe that regulations might be introduced which would materially lessen the prevalence of sickness among the men, without affecting the successful working of the really valuable mines. Many of the proprietors and managers are fully alive to the injurious influence of the occupation upon the men employed in it, and are most anxious that everything within their power should be done to promote the health and comfort of the miners. We do not, therefore, anticipate that any difficulty would occur in passing such an Act; and we hope no long time will elapse before a measure of the kind is introduced into Parliament. It is impossible to be brought in contact with the mining population without being struck with their many truly sterling qualities, and feeling a deep interest in their welfare, and an earnest desire to aid in lessening, if possible, the amount of the evils to which they are exposed.

REVIEW VI.

The Science and Practice of Medicine. By W. AITKEN, M.D. In Two Vols. Third Edition.—*London.* pp. 939–952.

To portray, even in outline, the science and art of medicine in 1864 is no light or easy undertaking. The vast extent of the subject, and the consequent labour and research required for its mastery, combined with the difficulty of giving a clear, well-digested, and, at the same time, condensed account of many intricate and perplexing questions in theory and practice, attach to such a labour a dignity far surpassing that of an ordinary compilation.

There can be no question that there was room for such a work as that before us. The great advances in pathology which have lately been made in Germany, as well as in our own country, had received no fitting and connected exposition, although good accounts of foreign researches in special departments have, from time to time, appeared in the pages of this Review, and in other journals. We believe that in bringing together the fruit of so much original research Dr. Aitken has not only fulfilled his original aim of supplying "a text-book for students following a systematic arrangement, which would give them a consistent view of the main facts, doctrines, and practice of medicine in accordance with the present state of the science," but that he has produced a work which will be prized by the busy practitioner as a pleasantly written and accurate digest of recent progress in the science and art of medicine.

The work is divided into four parts—viz., Part I. Topics relative to Pathology. II. Methodical Nosology. III. Special Pathology and Therapeutics. IV. Medical Geography. The first seven chapters are devoted to the discussion of preliminary and introductory matter. The student is told that, as a science, medicine comprehends physiology, pathology (general and special) therapeutics, and hygiene; that, as an art, it is chiefly concerned with special pathology and therapeutics; that in the investigation of disease he must study its signs or symptoms, its causes, its seats, its effects upon healthy structure, and the new products which often result from it; that the modern doctrines relative to the nature of diseases and the practice of medicine are guided by the dictates of *physiology*; and that it is

> "to physiology in its most comprehensive sense, and to a knowledge of the natural and normal development of animal and vegetable beings, that we must look for future progress in pathology; while the means and the instruments which advance physiology will simultaneously advance our knowledge regarding the *nature of diseases*—a sound knowledge of which can alone enable us to 'appreciate their causes,' and so arrange measures for the prevention of many of them, based on the great truths of science." (p. 15.)

Further, the practitioner is exhorted to study as much as possible the nature and effects of disease, and not to confine his attention to its signs or symptoms. By contenting himself with the latter, "he can have little conscious satisfaction in the study of medicine as a science, or in the practice of the healing art. In the words of Cruveilhier, he will during his lifetime 'see many patients, but few diseases.' Such a practitioner is not to be trusted." (p. 26.)

Having surveyed the vast extent of the field which the student of medicine has to cultivate, and having pointed out the method by which its culture may lead to the great end in view, the successful treatment of disease, Dr. Aitken next addresses himself to the consideration of those complex morbid states which more or less constitute the basis of every specific morbid manifestation—viz., fever, inflammation, and degeneration of tissue. The importance of a full consideration of these subjects can scarcely be overrated, and accordingly we find that the best writers on the practice of medicine have always dwelt largely upon the topics—fever and inflammation. The term "degeneration of tissue" is comparatively new in a text-book of practical medicine, for it is only of late years that the microscope has revealed various forms of degeneration which lead to serious morbid complications. A few words upon each of these subjects.

Following in the train of Cullen, Dr. Aitken prefixes to his account of each special disease or complex morbid state a *definition* or enumeration of the features essential to the constitution of the disease under consideration. Owing to the imperfect and unequal state of our knowledge, definitions of the various specific diseases must vary much in character. Instead of being an expression of the intimate nature or essence of a disease, the definition is too often nothing more than an enumeration of its causes, of its symptoms, or of its effects upon structure. On the whole, however, for the sake of identification, Dr. Aitken's system of definitions is not without value. We trust the time may yet arrive when a writer on special pathology may be able to define a disease according to its nature—that is, according to the precise character of the aberration from healthy function or structure which differentiates one morbid process from another.

In the definition of fever we are told that "it essentially consists in elevation of temperature which must arise from an increased tissue change, and have its immediate cause in alterations of the nervous system." These are the words of Professor Virchow, to whose generalizations and original thoughts we owe very much of our knowledge of pyrexia. Dr. Aitken would have done well if instead of merely referring to "Virchow" he had given a precise reference to the essay of the Berlin professor, which is certainly the most original and suggestive disquisition on fever written in our day. This leads us to remark that, in our opinion, the value of the work would be increased by a reference at the beginning or end of each chapter to the principal literature (modern) of the subject under consideration, so that the student might possess a ready and reliable guide to the extension of his knowledge on any particular topic. This is the more desirable, because any work on special pathology and practice must be regarded merely as an introductory and connected outline of a subject of vast extent and complexity. Returning to the chapter on fever, the most original and instructive modern essays in our own language are to be found in the Gulstonian lectures of Dr. Parkes (1855). Adopting the opinions of Virchow, Dr. Parkes has shown by clinical researches that in all fevers there is increased metamorphosis of tissue, and that this destruction of tissue is effected through the agency of certain parts of the nervous system is a fact which, although not strictly proven, is rendered in the highest degree probable. The phenomenon of fever which has of late received most attention is the increase of the temperature. That this is the most constant objective sign of fever much recent investigation proves. Long ago Galen told us that fever was *calor præter naturam;* and the introduction by De Haen of thermometry in clinical researches proves how exactly he hit the truth. The researches of Gierse, Roger, Traube, Zimmerman, Jochman. Parkes, and Wunderlich, have not only shown that the blood is hotter in all fevers (even in the cold stage of ague), but they have done much to ascertain the nature of the law regulating the variation of temperature in each specific form of fever. Of what consequence Dr. Aitken considers thermometry in disease may be learned from the following sentence:

> "The student or physician who continues to disregard the aid of thermometry in the diagnosis of febrile disease, or the military medical officer, who ignores its value in the appreciation of feigned disease, such as rheumatism, may be compared to the blind man guiding himself. By means of great practice and intelligence the blind man will often proceed rightly, but the advantages of being able to see clearly are proverbially above all price. The necessity of the use of the instrument, also, will soon become known to the general public, and patients will become dissatisfied if all known means of investigation are not employed in appreciating the nature of their malady. For many years the German student and physician has been familiar with its use; but with the exception of Dr. Parkes and the pupils he taught, when clinical professor in University College Hospital, the usefulness of the thermometer in recognising febrile diseases does not seem to have been hitherto sufficiently appreciated in the medical schools of this country." (p. 63.)

It is no part of our object to enter into details as to the nature of these thermometric observations; but a few remarks upon their general import may interest our readers, and may induce them to seek further information on the subject from Dr. Aitken's excellent analysis of Wunderlich's observations. The first questions the practitioner may probably ask are: Of what use is this thermometric inquiry to us? Will it teach us anything in diagnosis, prognosis, or treatment which we could not otherwise know? To each of these inquiries Dr. Aitken gives an affirmative answer. The normal temperature of the human body at a sheltered part, such as the axilla, is 98° 4′ Fahr. According to Traube, any variation from this standard beyond half a degree is inconsistent with health. A mere indisposition, attended with a considerable rise of temperature, ought never to be made light of, marking as it usually does the beginning of important disease. During convalescence a rise of temperature will invariably suffice to indicate a relapse or the advent of another form of disease, which, by due precautions, may be warded off. As regards diagnosis, it has been shown that specific forms of febrile diseases have their own characteristic variations of temperature. For example, the characteristic variations of the temperature, as exhibited in a typical case of enteric, intestinal or typhoïd fever, are of such a kind that they are not found in any other disease. So with other forms, should difficulty occur, observations of temperature may greatly aid diagnosis. Of course these observations must be made daily; but it appears there are cases in which a single observation may be sufficient to establish a certain diagnosis:

> "A person who yesterday was healthy exhibits this morning a temperature above 104° Fahr., is almost certainly the subject of an attack of ephemeral

fever, or of intermittent fever; and should the temperature rise up to or beyond 106° 3′ Fahr., the case will certainly turn out to be one of ague, or some other form of a malarious fever. Again, a patient under eighteen years of age shows the general symptoms of what looks like typhus fever; but one evening during the second half of the first week of illness, or during the first half of the second week, the temperature of his body sinks below 103° 3′ Fahr. without any external cause, it is a sure sign that the fever is not typhus. Again, in a patient whose temperature rises during the first day of illness up to 106° Fahr., it is certain he does not suffer from typhus; and of a patient who exhibits the general typical symptoms of pneumonia, but whose temperature never reaches 101° 7′ Fahr. = 31° R., it may be safely concluded that no soft, infiltrating exudation is present in the lung. Lastly, if a patient suffers from measles, and retains a high temperature after the eruption has faded, it may be concluded that some complicating disturbance is present." (p. 45.)

When taken *with other means of diagnosis* a single observation of the temperature will not unfrequently determine whether the disease is one of danger or not, and thus assist us greatly in prognosis. Let us adduce one more illustration in proof of the value of the thermometer in this sense:

"In typhoïd fever, a temperature which does not exceed on any evening 103° 5′ Fahr., indicates a probably mild course of the fever, especially if the increase of temperature takes place moderately towards the beginning of the second week. A temperature of 105° Fahr. in the evening, or of 104° Fahr. in the morning, shows that the attack is a very severe one, and forebodes danger during the third week. On the other hand, a temperature of 101° 7′ Fahr., and below in the morning, indicates a mild attack, or the commencement of convalescence. In pneumonia, a temperature of 104° Fahr. and upwards, indicates a severe attack. In acute rheumatism, a temperature of 104° is always an alarming symptom, foreboding danger or some complication, such as pericardial inflammation. In a case of icterus, otherwise mild, an increase of temperature indicates a pernicious turn. In a puerperal female, an increase of temperature indicates approaching pelvic inflammation. In tuberculosis, an increase of temperature shows that the disease is advancing, or that untoward complications are setting in. In short, the presence of the *fever temperature* (104° Fahr. to 105° Fahr.) in any disease indicates that its progress is not checked, and that complications may still occur." (p. 45.)

By means of the thermometer we can not only foretell whether a febrile disease is likely to run a mild or severe course, but by daily observations, the differential diagnosis of such diseases as ephemeral, intermittent, typhus and scarlet fever, small-pox, measles, acute rheumatism, erysipelas, pneumonia, and pyæmia may be surely established. In each case the variation of temperature is peculiar and characteristic, as may be learned at a glance from diagrams marking off the daily range of temperature. In Dr. Aitken's description of all of these diseases such diagrams from the works of Wunderlich and Traube are appended, and the whole subject of temperature has received from him the most careful consideration, and constitutes a new and important feature in his work.

The next section of the work, "On Inflammation," is carefully compiled from the writings of Paget, Bennett, Simon, Virchow, and Lister. Although it is confessed that to give a correct definition of inflammation is not possible, a definition is nevertheless attempted; but, as in other instances, it is an expression of the *characteristics* rather than of the *nature* of this complex process. Our modern notions of inflammation are distinguished from all which have preceded by being much less dogmatic and limited in their character. A history of inflammation would be that of "the pivot upon which the medical philosophy of the time has revolved." The ancients evidently regarded the heat as the most important of the four cardinal symptoms, since from it they named the process; but since that time each and all of the remaining three signs, the redness, the pain, and the swelling, have had their turn in the foreground. Some years ago one of the *results* of the process, the exudation of liquor sanguinis, was maintained by the Vienna school to constitute the essence and embody the nature of the process itself. But here, as elsewhere, it will be found that to select one of the characteristics or one of the results of a series of complex vital phenomena as the expression of the process itself, is calculated rather to lead us away from the truth of which we are in search. In attempting, therefore, to answer the question, What is inflammation? we must be content to give up the hope of finding a more concise formula, expressive of the whole truth. Amongst those who have quite lately extended our knowledge of inflammation, the names of Professors Virchow and Lister stand most prominently forth. Both observers have specially studied the effects of irritation on the extra-vascular elements of the tissue, and their results show that in inflammation the functional, nutritive, and formative properties of the tissues are gravely and essentially implicated. Mr. Lister has demonstrated that suspension of functional activity is one of the earliest phenomena, and that as a rule it precedes the condition of *stasis.* The German professor distinguishes a class of inflammations in which the change consists in an increased nutritive activity, the tissues themselves taking up a larger proportion of nutriment. These he names "parenchymatous" inflammations, as distinguished from the other form of inflammation in which an increase of secretion occurs (exudation)—secretory inflammations. The cornea, cartilage, the liver, the kidneys, connective tissue, &c., are subject to the first of these forms, whilst the mucous and serous membranes are commonly seats of secretory inflammation. The occurrence of exudation outside the vessels and *amongst* the tissues, Virchow says he has never seen. With regard to the condition of hyperinosis, opinion is now considerably changed. On this point Dr. Aitken remarks:

> "At one time it was believed that the blood was altered in its constitution chiefly by an increase of the fibrine and the white corpuscles, but it is now found that the white or rudimental corpuscles of the blood cannot be separated from the fibrine by any known process; consequently, the relative amount of fibrine cannot be correctly stated in relation to the blood. And as in many inflammations these corpuscles are increased, as well as in many conditions, such as pregnancy, in which no inflammatory process exists, the blood is similarly altered, it is not known how much of change is due to fibrine, or how much to the white corpuscles. The generation and accumulation of large numbers of white corpuscles is not now received as a fact." (p. 73.)

With regard to the compound granule cells as inflammatory products, Dr. Aitken believes that they perform a very important function, and are the media through which the liquefied, softened, and disintegrated products of inflammation are gradually absorbed. He adopts the views of Virchow as to the origin of pus cells, regarding them as the offspring of pre-existing germs. A mass of observations by Virchow, His, Weber, Billroth, Remak, Turner, Haldane, and others, are recorded in favour of this view; and we may now regard the conclusion of Virchow as satisfactorily proven, although some distinguished pathologists remain sceptical. The observation of pyogenesis in a tissue is admitted by all to be difficult; and, as Dr. Haldane has observed, "We must not expect to be able in the case of every abscess or purulent discharge to trace thus distinctly (as has been done in the preceding paragraphs), the origin of the pus cells. There is only a certain stage in pathological as in physiological growth, in which the actual mode of development can be followed." There is little doubt that extended research will confirm the doctrine that pus-cells originate in pre-existing cells or nuclei.

The third section of the chapter on complex morbid states contains an excellent account of the various degenerations to which tissues and organs are liable—viz., the fatty, mineral, pigmentary, and amyloïd. The description of the latter form is the best we have seen in any English work.

From chapter ix., "On Types of Disease and their tendency to change," we learn that Dr. Aitken is a believer in the change of type in inflammatory diseases, as well as in the specific forms of fever. Most unprejudiced persons who have read the papers of Drs. Alison, Christison, and Watson will have difficulty in escaping this conclusion. Nor is there any obstacle theoretically in believing that, although a local morbid process may be always the same, the constitutional expression of that process may vary according to the extent to which the general constitution is in itself changed. Indeed, as Dr. Aitken well shows, the general character of the diseases of our day is very different from that of those which affected our grandfathers, and the acute inflammation of Cullen has given place to one of a sub-acute or asthenic character. The habits of life in our age, amongst the young especially, are such as affect the general standard of nutrition: hence the febrile reactions and typhoïd complexion of inflammation when it is excited, and hence the abundance of those non-inflammatory complaints, now so common, the various forms of degeneration.

In chapter xi., "On the Treatment of Complex Morbid Processes," viz., fever and inflammation, several pages are devoted to the consideration of general blood-letting, its action, and the indications for its use; but the remaining remedies are rather briefly noticed. We should like to have had something about the indications for and mode of action of local blood-letting, the comparative advantages of the various methods of local blood abstraction, the action or theory of action of the various forms of counter-irritation, the general indications for the different classes of purgatives, &c. In regard to mercury in inflammation, Dr. Aitken believes it to be useful in the sthenic forms, and in membranous inflammations, and such as go on slowly, as it "tends to prevent effusion and favour absorption of effused products."

Part II. is devoted to Nosology. The principal object of a work like that now before us is to teach students the nature, the recognition, and above all, the treatment of diseases. This subject being very extensive, economy of space is requisite. When we remember how imperfect are all attempts uniformly and consistently to define, to name, and to classify diseases, we think that this part of the work might very well have been omitted, and the twenty-six pages which it occupies devoted to matter of more importance to the student. A sufficient indication of the author's views on classification may very well be obtained from the order he follows in the description of special diseases.

Part III. is devoted to Special Pathology. It naturally constitutes the chief portion of the work. The order in which diseases are described corresponds pretty closely to the classification of the Registrar-General. Zymotic diseases are arranged under the heads Miasmatic, Enthetic, Dietic, Parasitic. These subjects occupy the first volume of the work.

In some remarks on the general pathology of the miasmatic class of diseases, Dr. Aitken acknowledges three modes of origin, or three classes of poisons,—viz., 1st, paludal malarious poison; 2nd, animal malaria poison; and 3rd, specific disease poison. The first form of poison is now almost unknown in this country. Dr. Aitken and most other people think that the cause of its disappearance is the improved drainage of the country. But even on this point "doctors differ," and we find a high authority, Dr. Christison of Edinburgh, expressing the opinion that its disappearance is *not* due to this cause. The next group of poisons—animal effluvia—arise from the decomposition of animal excreta. What is the precise action of such effluvia? Does the decomposition of feculent matter, urine, and other animal excretions, produce a poison which, by entering the blood, is capable of giving rise to any of the specific forms of miasmatic disease? On this point Dr. Aitken is not quite clear, but we presume he regards such "effluvia" as merely favouring the action of his third group of poisons, and therefore as predisposing causes only. If so, this class of poisons ought not to be placed alongside the other two forms. In reference to the third group Dr. Aitken states (p. 213): "The matter by which the specific miasmatic diseases are communicated and propagated, is solely derived from the body of the similarly diseased human being;" in other words, such poisons are not capable of being generated "*de novo*" by any combination of circumstances within the body or without it. In regard to endemic influence, Dr. Aitken attributes it to imperfect sanitary conditions favouring the action of specific poisons. In reference to sewage he remarks:

> "In large towns the sewers are constantly charged with the *materies morbi* of specific diseases always abounding in towns. In small villages and other places where no sewers exist, the air only may be infected, or the water con-

taminated by the direct or indirect importation of cases of specific disease or their equivalents—the poison itself—so that the organic impurities, the dung-heaps, the open soil which surrounds the dwellings of the patients, the cess-pools, and the privies common to several houses, gradually, but eventually, become impregnated with the specific poison of the disease. Thus, the atmosphere of the village may become incomparably more virulent than the atmosphere of the sick chamber itself. Hence the rapid epidemic spread of the miasmatic diseases in the limited space of rural villages, and which gives rise to the popular error, that such diseases are invariably contagious in country places, and only rarely so, or by exception, in cities or large towns." (p. 216.)

It appears, then, that in the author's opinion the sewers of towns and the dung-heaps, cess-pools, &c., of villages, are all-important as disseminators of some of the miasmatic disease poison. After the discussion on this subject which took place at the meeting of the British Association at Bristol last September, one feels inclined to ask—How far does the supposition that sewerage and decomposing organic matter, &c., favour the propagation of the specific disease poisons rest upon accurately ascertained facts? We confess that the study of Dr. Aitken's chapters on Endemic and Epidemic Influences, has served rather to impress on us our complete, or almost complete, ignorance of the essential conditions of the phenomena in question. In its results, no field in medicine is more likely to repay inquiry than an investigation of the conditions essential to the origin and propagation of these forms of disease.

Following the description of small-pox is a very full and complete account of cow-pox and vaccination, and at no time more than the present is it requisite that young practitioners be acquainted with the history and effects of vaccination, so that they may be prepared by knowledge and argument to overcome the prejudice against this practice, which, for some years past, has been growing in the popular mind. From our own observation we believe with Dr. Aitken, that "to an almost incalculable extent the *protective power* of vaccination has been impaired by imperfect vaccination, as shown by Mr. Marson, a fact which does not seem to be duly appreciated as yet, either by the medical profession or by the public." (p. 291.)

Miliary fever is described as a form of exanthematous disease. Dr. Aitken saw "a great number of cases of it amongst the Turks in their military hospitals at Scutari during the war against Russia in 1854–56. The temperature and physical climate of that place, combined with the relaxed habits of the Turks, appear to be favourable to the development of such a disease."

In the treatment of scarlet fever carbonate of ammonia is advocated, and apparently from Dr. Richardson's point of view: "Looking also to the morbid condition of the blood, and to the tendency which exists to the deposition of fibrine in the right cavities of the heart, small doses of carbonate of ammonia (three to seven grains) administered every hour, or every three hours, have been recommended." As a gargle, the solution of peroxide of hydrogen is specially mentioned.

Under the title, "Hybrid of Measles and Scarlet Fever," the disease well known in Germany as "Rötheln," is defined as:

> "A specific eruptive disease preceded by, and accompanied with fever, watery discharges from the eyes and nose, sneezing, and sore throat. The eruption appears on the fourth day, and consists of crimson stigmata, rapidly running together into patches of an irregular shape, with obtuse angles, and of sizes varying from a threepenny to a crown-piece, according to the severity of the case. The eruption continues from six to ten days, and terminates in desquamation by furfuraceous scales."

The description of this disease is chiefly derived from the observations of Dr. Robert Paterson, of Leith, who carefully described it in 1840.

The continued fevers—viz., typhus, typhoïd, relapsing fever, febricula, and specific yellow fever, are all fully and well described. A history of the two first fevers shows that up to 1846, opinions as to their specific nature were crude and imperfect. In that year Dr. Jenner led the way in attempting to prove that these fevers were distinct in their symptoms, course, and post-mortem appearances; whilst he, and more recently Dr. Murchison, have wrought at a more difficult subject of inquiry—their distinctness of causation. Valuable evidence towards the same conclusions is supplied by the recent observations of Drs. Wunderlich and Griesinger, who state that the range of temperature follows a perfectly different course in each. To the original labours of Drs. Jenner, Parkes, and Murchison, we owe much of the recent advance in our knowledge of the continued fevers, but the names of Christison, W. T. Gairdner, W. Budd, and a few more, are intimately associated with the history of the continued fevers.

"Simple continued fever or febricula" is employed to denote a short one, two, or three days' fever, capable of being produced by a variety of causes, and in itself not of a contagious nature. A quick rise of temperature (from 98° to 103° on the first day) is characteristic. The "ardent fever," sun fever, and the common continued fever of Burmah and India generally, are all names which indicate severe or protracted cases of febricula.

"Gastric fever," of which we have heard a good deal of late years, is mentioned as an "anomalous" form, but no description of the complaint is given. We are inclined to agree with Dr. Anderson, of Glasgow, in regarding this form of fever as distinct from the others, and sufficiently defined in its symptoms and frequent in occurrence as to permit of accurate description.

Malarial fevers come next in order. Of these, three forms are described—intermittent, remittent, and malarious yellow fever. The experience of Sir Ranald Martin, than whom, perhaps, no one has had greater in these forms of disease, is largely drawn upon, as also that of Drs. Murchison and Maclean. The latter physician has favoured his colleague with a written statement of his views on the treatment of remittent fever. His practice is essentially that of Lind, Clark, and others, and consists in the administration of full doses of quinine, preceded by a purgative. The advantages of such old and well-known treatment have been fully recognised for what it is worth, by Sir Ranald Martin and other writers.

As one of the enthetic order of diseases syphilis is described. It is novel to meet with an account of this disease in a Textbook of Medicine, but pathological research during the last ten years has proved that the syphilitic poison is the cause of special lesions of various internal organs. The physician is called in long after the surgeon has healed the primary sore, and his aid is solicited to remedy the impaired health, the degenerate constitution, and the various internal lesions which owe their origin to this baneful and wide-spread poison. It is therefore perfectly fitting and proper that syphilis should find a place in every text-book of medicine. The account of it in Dr. Aitken's work is brief but full. The varied history of the disease is traced, and the present state of our knowledge, founded on the researches of Rollet, Diday, Lee, Thompson, Sigmund, Von Baerensprung, and others, is clearly sketched. In regard to the tertiary phenomena of syphilis (which most interest the physician), it is stated that "the constitution of the person also materially influences the phenomena which supervene during syphilis—e.g., gout, rheumatism, tuberculosis, and cancer, modify the syphilitic lesions and degenerations; while constitutional syphilis in its turn modifies the character of ordinary diseases." In persons of a rheumatic constitution, the serous, fibro-serous, white connective-tissues, are the sites of the lesion in the form of periostitis, iritis, corneitis, and affections of the true skin; in those of tuberculous tendency, syphilitic growths are apt to be developed in the lungs, the glands, and brain, pharynx, larynx, tonsils, tongue, and testicles; whilst in the gouty, the arterial or vascular structures and joints are the parts most apt to suffer. Syphilis may be set down as a cause of disease in the great bloodvessels, leading to thoracic and abdominal aneurysms at an early period of life; and of the smaller bloodvessels leading to amyloïd degeneration of the liver, kidney, spleen, and intestines. Such views of the action of the syphilitic poison are of modern date, and have arisen from a close study of the association of this disease with alterations of structure of internal organs. The characteristic lesions of tertiary syphilis are termed *gummata*, and are to be distinguished from other morbid deposits rather by negative than by positive characteristics. They are found in the heart, lungs, brain, liver, testicles, and bones. A form of bronchitis is frequently associated with syphilis (Walshe), and in those predisposed, syphilis tends to induce phthisis. It is very evident that syphilis must now have a place in every work similar to that before us.

Amongst the diseases depending on peculiarity or abnormality of ingesta (dietic diseases), we find descriptions of ergotism, bronchocele, and paralysis of the lower limbs, produced by the use of Lathyrus sativus. The first named is a peculiar form of gangrene, induced by the ergot fungus which infests unsound rye and other grains.

Although much more common in France, the disease has occasionally occurred in this country and in Ireland. Bronchocele is regarded as a dietic disease, inasmuch as it depends on the "persistent use of water which has percolated through magnesian-limestone rocks or strata, and containing the salts of lime in solution." To the same cause is attributed the cretinism so generally associated with bronchocele. The effect of flour made from the Lathyrus sativus, a species of vetch, in inducing paralysis, has been observed and described by Dr. Irving, surgeon of Allahabad, where the disease occurs. The flour is generally mixed with wheat or barley flour, and it is only when the proportion exceeds *one-twelfth* that it is injurious. When it exceeds *one-third* the specific paralysis sets in.

Much care has been bestowed on the description of the parasites —animal and vegetable—which infest the human species. Here as elsewhere, recent pathological research has greatly extended during the last ten years, and we find accordingly that the list of animal and vegetable parasites has been much amplified.[1] Although, for practical purposes, the physician is required to know intimately only some three or four of the entozoa, he may, if he chooses, extend his acquaintance in that direction to some thirty species! One of these worms, the Trichina spiralis—formerly regarded as a harmless parasite—has of late years proved to be not only a very frequent inhabitant of human muscle, but to be the cause of serious and deadly disease. An excellent account is given of the history of this subject, beginning with the first case observed by Zenker, of Dresden, embracing the researches of Virchow, and ending with a narration of the fearful catastrophe which happened a little more than a year ago at Heltstädt, in Prussia. Of the various fungi or cryptogamous plants which find a suitable soil on or in the human skin, Dr. Aitken enumerates ten species, the diagnosis of each of which requires careful and skilful use of the microscope. It is to be regretted that this department of medicine should be so disfigured by a confusion of nomenclature. It has arisen from the fact that specific names have been conferred on these epiphytes before their nature was sufficiently known. The latest addition to our knowledge in this field is that made by Dr. Carter, of Bombay, and the Chionyphe Carteri (so named by Berkely), must hereafter have a place amongst the Microsporons and other human epiphytes. The disease to which this parasite gives rise exists in three distinct forms, all of which are fully described in Dr. Aitken's work.

The next great class of diseases, the constitutional, are thus contrasted with the zymotic:

> "While the zymotic diseases may be said to become developed in the human body under the direct influence of agents acting from *without*, the constitutional diseases, by contrast, may be said to become developed under the influence of agents generated *within* the body itself, and acting through the continuous exercise of its functions." (p. 1, vol. ii.)

It is further laid down that these diseases are "apparently generated, developed, and sustained under the influence of an intrinsic blood-poison," and that "each has its specific morbid principle," and "its specific curative agent—an antidote for each poison." Are these doctrines applicable to such diseases as anæmia, leucocythæmia, and asthma, which we find in the same class as rheumatism, tuberculosis, and cancer?

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[1] See the Review, No. III., p. 330, entitled Entozoa, in the present number.

In the articles rheumatism and gout, prominence is given to the views of Fuller and Garrod; in that on leucocythæmia, the merits of the rival claimants of the discovery of this disease are carefully adjusted, and the results of their labours condensed; under the designation supra-renal melasma, the labours of Addison, Wilks, Hutchinson, and others are collected. We are then attracted by a name somewhat new to English medical ears—viz., beri-beri, or the bad sickness of Ceylon. The following definition of this disease is given:

> "A constitutional disease, expressed in the first instance by anæmia, culminating in acute œdema and marked by stiffness of the limbs, numbness, and sometimes paralysis of the lower extremities; oppressed breathing (anxietas in paroxysmis); a swollen and bloated countenance; the urine is secreted in diminished quantity; the œdema is general not only throughout the connective tissue of the muscles, but the connective tissue of solid and visceral organs in every cavity of the body, is bathed in fluid. Effusion of serum into the serous cavities themselves very generally precedes death."

The accounts of the remaining constitutional diseases embrace the most important recent observations. Thus in that of Bright's disease, we have a *résumé* of the views of Johnson, Wilks, and Goodfellow. The pathology of diabetes is based on the physiological researches of Parkes, Lehmann, Bernard, and Pavy; whilst in its treatment the experience of Dr. Camplin is largely drawn upon. In the article asthma, the views of Dr. Salter and of Mr. Pridham (Devonshire), are given. To the descriptions of the cancerous and tuberculous cachexias seventy-nine pages are devoted, and the matter of these comprises the labours of Paget, Virchow, Bennett, Walshe, and many others. As a sample of the sensible and practical manner in which the author treats these important topics we may quote the following sentence from the chapter on tuberculosis:

> "Most assuredly the physician will have to turn his knowledge of the pathology of tuberculosis to account in every phase of his professional life; nay further, when he knows what experience has now adequately demonstrated, that the tuberculous cachexia springs from causes over which the public, rather than the medical profession, have control, he must be at once impressed with the belief and encouraged with the hope that when he acquires the confidence of the public in the practice of his profession, he may exercise a powerful influence for good in teaching how much they may themselves control the ravages of *consumption* by prudent marriages, sanitary attention to offspring, and the necessity of free ventilation, and of fresh air in places inhabited by man." (p. 186.)

The third great class of diseases, those characterized by localisation of the morbid process, is a very large one. Under it are arranged the various forms of nervous, thoracic, abdominal, and skin diseases. Time and space forbid our entering into details in reference to Dr. Aitken's treatment of these topics; suffice it to say, that here, as elsewhere, he has brought to bear on each subject all the light which recent advances in the method of examining, diagnosing, and treating the varied forms of local disease have imparted. And in saying this we must remember that such advances have been very great, and the labour required of the writer to follow them proportionally great; yet we feel assured, by perusal of his work, that Dr. Aitken has accomplished this difficult task wisely and well. Those who wish to know the present position of medical science could not do better than take Dr. Aitken as their guide.

We must not omit to mention that, in addition to all we have noticed, the fourth and concluding part of the work is devoted to medical geography. The interest of this account is not greater than its novelty, for, as far as we know, no similar attempt to bring into so small a compass the results of enquiries so extended has ever been made. The chapter materially adds to the value of the work.

Review VII.

A System of Surgery, Theoretical and Practical, in Treatises, by various Authors. Edited by T. Holmes, M.A. Cantab., Assistant-Surgeon to St. George's Hospital and to the Hospital for Sick Children. Vol. IV.—*London*, 1864. 8vo, pp. 1079.

We have now received the fourth and last volume of Mr. Holmes's 'System of Surgery.' Each of the preceding volumes has been noticed in the pages of this Review as it appeared; we shall now endeavour to give our readers some idea of the contents and value of the volume before us, and then take the opportunity of casting a glance over the entire work, and seeing how far and with what success the plan originally laid down has been carried out.

The present volume is larger than any of its predeeessors. It numbers 800 pages, besides an appèndix of 250 more! The subjects which it includes are the diseases of the organs of digestion, of the genito-urinary system, of the breast, thyroïd gland, and skin; besides several essays on miscellaneous subjects which find a place in the appendix. The volume is prefaced by a table of contents, so full and clear as to constitute almost an analysis of each article which it contains; while a copious index to the entire work is given at the end.

The volume before us opens with an essay by Mr. James Salter, "On the Surgical Diseases connected with the Teeth," an interesting and instructive paper. It is chiefly taken up with those subjects —gumboil, epulis, abscess of the antrum, dentigerous cysts, &c.— which fall under the care of the general surgeon more than under that of the surgeon-dentist. The article contains a good abstract of all that is known about the "phosphorous disease," and concludes with some useful information on the subject of obturators and palate-plates, which have been brought to such perfection of late years—thanks to the exertions of Mr. Salter and other dentists.

Next, we have a short paper by Dr. Barclay "On Diphtheria and Croup." We cannot, of course, expect these subjects to be handled at any great length in a system of surgery. It is only as they may require operative treatment that they come within the province of the surgeon. We are inclined to think that Dr. Barclay, in summing up, puts the case rather too strongly when he says, in speaking of the concurrent condition of the lungs, "if any sort of crepitation be audible, to undertake the operation of tracheotomy would be quite unjustifiable." In a case which is otherwise suitable for operation, would a slight amount of bronchitis be any reason for withholding from the patient this his last chance of recovery? Few surgeons, we think, would be deterred from performing tracheotomy on this ground.

From diphtheria and croup we pass to an essay by Mr. G. D. Pollock "On the Diseases of the Mouth and Alimentary Canal." Beginning with the diseases of the inside of the mouth—quinsy, cleft-palate, &c.—the writer goes on to the affections of the lips, of the jaws, of the pharynx and œsophagus, and of the abdomen. We observe, however, that the diseases of the tongue are not included, as we might have expected, in this paper. They are to be found in the third volume. Is there any good reason why diseases which seem to be so closely associated in their anatomical relations should be thus widely separated? Again, cysts of the lips are treated in the essay before us, but ranula, an affection which, in its situation as well as in its probable pathology, is closely allied to them, is not in this volume at all. Again, we notice that, although Mr. Salter, in his paper "On the Surgical Diseases of the Teeth and Gums," which stands at the commencement of this volume, has spoken at some length of obturators and palate-plates, Mr. Pollock, almost of necessity, reverts to the same subject in speaking of cleft-palate. This fault of repetition—alluding to the same subject under several heads, instead of disposing of it once for all—seems to be one of the weak points in a system of surgery by various authors.

Next, we have an article by Mr. Henry Smith "On the Diseases of the Rectum." It appears to us to be one of the best written and most readable papers in the volume.

This is followed by a long and elaborate essay "On Hernia," by Mr. Birkett, in which the whole subject is handled, and those nice questions which are involved in the treatment of strangulated cases clearly and fully discussed. It may be useful to quote a history which is given by the writer to show how ignorant some surgeons are, even at the present day, of the necessity for performing an operation in cases of strangulated hernia as soon as other means have been fairly tried without success:

> "A fine woman for her age, which was seventy-one years, known to be the subject of strangulated femoral hernia, was allowed to vomit persistently for between ten and eleven days. At this time she was sent to the hospital 'for the operation,' which necessitated a journey of several miles. She arrived cold

and pulseless, though intelligent; the abdomen was tympanitic; she was in fact moribund. As soon as practicable the liberation of the bowel was effected. The escape of purulent fluid from the abdomen was sufficiently characteristic of the condition of the peritoneal cavity. In spite of warmth applied to the surface of the body and stimulants administered internally, she expired in a few hours after admission. Yet, during the ten days preceding, medicines had been prescribed to arrest the vomiting, taxis had been frequently employed, and the marvel was, as a friend who accompanied her expressed it, that she reached the hospital alive. What other result than death could have been anticipated? *Ten days'* vomiting, and starvation for the same period, was surely enough to destroy life at the age of seventy-one years; but, in addition, she had a perforating ulcer at the point of junction of the upper division of the alimentary canal with the hernia, extravasation of stercoraceous matter, and diffused peritonitis."

The following anecdote shows an equal degree of ignorance—ignorance which one can hardly credit in these days, and in the immediate neighbourhood of the metropolis:

"Only a few weeks since we heard a physician relate the following circumstance:—Being asked to see a poor woman who had been vomiting for several hours, he discovered a hernial swelling. He suggested that a surgeon should at once see the case, intimating that an operation was urgently needed. The gentleman in attendance immediately replied, 'But will it not be desirable to wait until the vomiting has ceased before the performance of the operation?'"

The next article, "On the Diseases of the Urinary Organs," is by Mr. Henry Thompson. The reputation which the writer has earned in the treatment of this class of cases is a sufficient guarantee of the value of his essay. The following passage in his introductory remarks commends itself to us as an exposition of the scientific spirit in which surgery ought to be studied:

"Few things conduce more to error in estimating symptoms than a too exclusive specialism in the observation of disease. The study of stricture and of other forms of urethral obstruction, of vesical diseases, of calculous formations, and of those chronic changes in the secreting structure of the kidney which are conventionally assigned to the physician, must be pursued together, if the surgeon is properly to appreciate the import of any one of these affections. For example, suppose a surgeon about to perform an important operation upon the bladder or urethra—(and what operation there is not important?)—who is unacquainted with, or is at least indifferent to, the chemical and microscopical characters of his patient's urine, will any one, who is himself acquainted with those indications of the condition of the kidneys which these characters reveal, deny that elements most important to the formation of a correct diagnosis, and therefore, to an appropriate therapeutical scheme, must be absent from the mind of the surgeon in relation to that case? It may be replied, that the necessary information can be obtained from a physician. Ought the surgeon to be dependent for an acquaintance with the facts required upon any other observer in such a case? Assuredly not: not only is the knowledge easy to attain and convenient to possess, but it may be safely held that the surgeon who views with equal intelligence the lesions, both functional and organic, which affect the kidneys, the bladder and the urethra, will be, *cæteris paribus*, the safest and most successful adviser in the ailments of any one of those viscera. The relations which mutually subsist between each of these series not only by contiguity, but by other and less obvious connexions, are so numerous and constant, that a study of the whole can alone qualify the practitioner intelligently to treat disordered functions in any part thereof. I do not hesitate to affirm, that no man can deal adequately and safely with cases of impaired urinary functions whose hand is not well trained to the use of the sound or catheter, whose eye is not familiar with urinary deposits in all their varieties of crystals, corpuscles, and renal casts, and who is not acquainted with their indications, so far as these are known, as well as with the significance of those subjective phenomena which are found accompanying them. The exploring sound is quite as essential to the diagnosis of urinary disease as the stethoscope is to affections of the chest. He who is a physician only will (and does) constantly overlook calculus and stricture, to the great detriment of the patient; while the mere surgical handicraftsman will (and does) treat mechanically many a case which can only be injured by his manipulations. With these views, the careful study of all acute and chronic renal affections is recommended to the student who desires to qualify himself specially for the practice of surgery."

The subject of urinary calculi and lithotomy is treated by Mr. Poland. He has brought together a great number of statistics on a variety of points connected with the subject, and has endeavoured, as far as figures can do it, to furnish us with rules of practice. The kindred subject of lithotrity has been entrusted to Mr. Charles Hawkins, who has ably performed the work placed in his hands.

The next paper is on the surgical diseases of women, by Mr. Jonathan Hutchinson. We are glad that a separate chapter has been devoted to this subject; its increasing importance demands it; and we are pleased to see that it has been assigned to Mr. Hutchinson, who is known as an accomplished general surgeon, rather than to one who has studied the subject as a specialty. The article contains many topics of great interest; among others, the surgical treatment of extra-uterine pregnancy and ovarian disease.

Mr. Humphry, of Cambridge, follows with an essay "On the Diseases of the Male Organs of Generation." We have been particularly pleased with the high moral tone which the writer adopts, and with the way in which he handles some of the delicate questions involved in his subject. In speaking of the functional disorders of the testicle, he says:

"An interesting and important, though difficult and rarely discussed, point in physiology is the relation of the generative apparatus to the moral character, and the degree in which the former is subservient to and regulated by the latter. I think it would be found that it is so to a very great extent—to a greater extent, perhaps, than is usually recognised; and it is desirable that practical men should pause awhile upon a question of this sort, and not hastily commit themselves to opinions which may have much influence upon the well-being and happiness of society. There are no organs so much under control as those of generation. Their functions are neither directly nor indirectly, in the least, essential to life, scarcely even to the well-being of the body; indeed, which is more remarkable and unusual, they are scarcely essential to the maintenance of the structure of the organs themselves in perfect integrity. The functions of the testicle, like those of the mammary gland and the uterus, may be suspended for a long period, possibly for life; and yet its structure may be sound, and capable of being roused into activity. In this respect its qualities peculiarly adapt it for subserviency to man's moral nature. Not that it yields a tame and easy submission. By no means. That stern struggle between the moral and the physical is one of man's greatest trials; a trial which it may be presumption voluntarily to encounter, yet a trial which is, at some time or other, laid upon most men; and it is some satisfaction to know, that if the victory be with the moral, it is not necessarily at the expense of the physical. It is, perhaps, partly with the view of giving strength for this control, or rather, of disarming the antagonist, that the advocates of celibacy among the clergy are usually the advocates also of stringent and regularly repeated fastings."

The subject of gonorrhœa has been treated by Mr. Henry Lee and Mr. Marston, of the Royal Artillery, two of our best English authorities on the subject of venereal disease.

The diseases of the breast are fully discussed by Mr. Birkett; and the affections of the thyroïd gland are briefly treated by Mr. Holmes Coote.

The next article, "On the Diseases of the Skin," by Dr. Jenner and Dr. Hillier, is one of the best in the volume, and supplies the most recent information as to the pathology and treatment of the various maladies with which it deals. This is followed by an essay "On the Local Affections of the Skin and its Appendages," by Mr. Thomas Smith. In this chapter we find boil and carbuncle, standing between bunions on the one hand, and chilblains on the other; an arrangement which seems to us awkward and unscientific.

So much for the body of the book. We now come to the Appendix, which contains some subjects of so much importance that it is difficult to understand why they were not incorporated in their proper places in the work itself, instead of being included, as a sort of after-thought, in the Appendix. The first essay is "On the Surgical Diseases of Childhood." It is chiefly written by the editor; but that part which treats of congenital dislocations is by Mr. Brodhurst; while the subject of lateral distortion of the spine has been assigned to Mr. Shaw. Whether there is any occasion for a separate essay "On the Diseases of Childhood," is, we think, fairly open to a question. Would it not have been better, for example, to have placed rickets side by side with mollities, and the other diseases of bone, so as to have brought out both the points of similarity and of difference? Again, would it not have been better to have classified lateral curvature along with the diseases of the spine? If this had been done the arrangement would have been, we think, better than it now is, and the essay before us might have included merely the congenital malformations.

The next article is "On Surgical Fever," by Mr. Croft. The subject is handled somewhat briefly, and the varieties of traumatic delirium, with the treatment appropriate to each, are almost unnoticed, although in practice they give rise to difficult and perplexing questions.

The essay "On Apnœa," by Dr. George Harley, is among the best in this volume. The writer's experiments upon the absorption of water from the lungs, and other kindred subjects, are full of interest and of great value.

The parasites of the human body and the diseases which they produce (exclusive of those which have been included in the chapter "On Skin Diseases"), and the injuries inflicted by venomous insects and reptiles, are discussed by Mr. Busk.

This is followed by an article on "Surgical Diagnosis and Regional Surgery," in which the editor gives a variety of miscellaneous information, and adroitly fills up any gaps which may have been left by previous writers. Next, we come to an elaborate and interesting article "On Hospitals," by Sir Ranald Martin. In this essay the construction and administration of Hospitals is fully discussed, and the reader is furnished with an abstract of the results, which have been obtained of late years by the increased attention paid to everything connected with the management of hospitals.[1]

The work concludes with a paper "On Surgical Instruments and Apparatus," by Mr. Holmes Coote and Mr. J. C. Wordsworth. It is very short, and appears to have been curtailed on account of the enormous size to which the volume had already grown. Under these circumstances, one cannot help thinking that it would have been better to have omitted it altogether, than to give such an imperfect idea of a surgeon's armamentarium at the present day.

The latter part of the volume is much condensed, and proportionately difficult to read; for whereas in the earlier part the type is partly large and partly small, in the last three hundred pages it is all small.

We have now given our readers an idea of the contents of this volume, and of the relative merits of the essays it contains. Before we part with the work altogether, we wish to take a cursory view of it as a whole.

As a system of surgery it is most unsystematic. But the editor acknowledges this so frankly in the preface to the fourth volume, that he disarms criticism. The arrangement which has been adopted appears to have been made rather with a view to the convenience of the writers than with any attempt at scientific precision. So far as classification goes, there can be no doubt that a "system" by one author, such as Professor Miller's, has the advantage over the one under consideration, although in other respects there is no comparison between the two works. In the volumes before us, we have a series of essays, which are, for the most part, excellent of their kind, but which are strung together with very little order or method. The result is, that the minor points which link one subject to another are sometimes altogether absent. It appears as if writers were afraid of treading on the domain which has been assigned to another, and hence are constrained to content themselves with a reference, instead of ascertaining that the two subjects are properly dove-tailed with one another. In some essays, the way in which the reader is referred from place to place appears to us unsatisfactory; while, in other cases, it is equally unsatisfactory to find that the same subject is treated, at greater or less length, under more than one head.

Again, it appears to us that some subjects are strangely out of place. How comes it, for example, that gonorrhœa is discussed in the fourth volume, and syphilis in the first? We presume the reply would be—

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[1] To this essay we hope to make further reference in a contemplated article on Hospital Construction and Arrangements.

Because syphilis infects the system, and gonorrhœa does not. But does syphilis always infect the system? Is there not such a thing as a non-infecting sore? Would it not have been much better to have placed the venereal diseases side by side in the fourth volume? Whatever distinctions are drawn between the different varieties, they have surely enough in common to warrant such an arrangement. Again, we hardly understand why surgical fever, apnœa, and the diseases produced by venomous insects and reptiles are placed in the Appendix. The preface to the first volume does not lead us to suppose that the Appendix was originally intended for such subjects as these. If they were overlooked in the original scheme of the work, it was of course necessary to supply the deficiency; but we do not understand on what principle they could be intentionally reserved for the Appendix. The papers upon Hospitals and Surgical Instruments are the only ones which, to our thinking, ought to have been placed in the Appendix; and even these might have stood at the end of the work as an integral part of it.

We are strongly of opinion that the operations should stand at the close of a work on Surgery, and not in the middle, as in the case before us. Here, we find them described long before we come to some of those conditions which require operative interference.

The above strictures are on minor points. The System of Surgery by various authors will remain as a record of the state of scientific surgery in England at the present day, of which the profession has reason to be proud. Many of our most eminent surgeons have been associated in the work. In not a few cases the essays have been written by men who have devoted special attention to the subjects of which they treat, and who have earned for themselves European reputations.

As a work of reference, these volumes will be found of the utmost value. The subjects they contain are co-extensive with the whole range of surgery, including the affections of the skin, the diseases of the eye and of the ear, and other topics which are sometimes omitted in surgical treatises.

No small credit is due to the editor, Mr. Holmes, not only for the able articles he has himself contributed, but also for having brought the work to a successful issue, notwithstanding the difficulty, which at times must have been very considerable, of getting a number of busy men to co-operate, and to fulfil their literary engagements amid the press of their professional avocations.

PART SECOND.

Bibliographical Record.

ART. I.—*Medical Errors and Fallacies connected with the Application of the Inductive Method of Reasoning to the Science of Medicine.* By A. W. BARCLAY, M.D., F.R.C.P., Physician to St. George's Hospital, &c.—*London*, 1864. pp. 123.

THIS is a book we would not recommend to unprofessional readers, but strongly to those of our own profession. In the former, we think it would tend to produce a universal scepticism as to the virtues of drugs, and shake altogether their confidence in medical practice and practitioners. In the latter, its tendency might be beneficial, by checking dogmatism, diminishing credulity, promoting doubt as to the efficacy of many modes of routine treatment in use, and hesitation as to the hasty adoption of new methods and new remedies.

The design of the work is, we think, excellent; and though its author has not completed it, as it would appear from his modest confession, in so finished and perfect a manner as he could wish, yet we are sure that in publishing it, such as it is, he is doing good service, and that those who have the interest of humanity at heart—an interest inseparably connected with that of genuine medical science—will not hesitate in acknowledging their obligations to him for what he has written.

The inductive method of research, we fear it must be confessed, is a difficult subject; and that though the term is much used, it is often employed without any very definite ideas of its nature. By some it is considered little more than a generalization of facts; by some, as the opposite of reasoning *à priori;* by others, the numerical method and the inductive have been very much confounded; and by others, the inductive method has been considered as essentially connected with causation, as if, as our author expresses it, its peculiar province were to establish the relation of cause and effect, and to indicate its laws.

The merit, as it appears to us, of Dr. Barclay's little work, lies not so much in making clear what the inductive method of reasoning is, as in showing the many fallacies in medical science resulting from the improper use of it, and how exceedingly it is open to abuse.

Had he had recourse to other sciences and at other times, he might have found as ample materials as in medicine, and at the present period, for inculcating his views. Bacon, the originator of the method, if

Aristotle is not acknowledged as such, would have afforded him in his 'Sylva Sylvarum' ample scope; Stahl in chemistry, Descartes in astronomy, would have furnished him with excellent examples; and the great impostors of the present time, the inventors and propagators of the shameful delusions to which so many persons of more than ordinary talent have given their assent—such delusions as mesmerism, clairvoyance, spirit-rapping, homœopathy—might supply him with matter for exposing the imperfection of human reasoning under the mask of a quasi-inductive method.

From the character of Dr. Barclay's work, it would be futile to attempt an analysis of it. We hope it will find a place in every medical library, and that the perusal of its pages will not be limited to a few—those who have least need of the instruction it affords. For the benefit of the many, into whose hands we fear it will not come, we shall make some extracts from it, in which its spirit will practically be found:

"In its practical application, medicine must be in great measure deductive. This is no disparagement to the science, which, so far as it is true, is a science of observation and experiment. The exact sciences are themselves all deductive, and rest on a comparatively small number of inductions of the very highest order. Their laws are co-extensive with the realms of nature and the furthest reaches of thought; and in their application to individual cases, they are unerring if the deductive process of reasoning be logically carried out. In medicine, the most absurd systems, as well as the most scientific, have been equally deductive; but the former have rested on hypotheses, which were perfectly gratuitous, or inductions which were utterly false. Scientific medicine endeavours to appropriate the laws of physiology, pathology, and therapeutics, and to apply them to the management of any case under consideration. The process of reasoning, it must be confessed, is a very complex one, even when no doubt attaches to any of the premises, and the conclusion is very liable to be erroneous. First, the exact state of the patient has to be made out, and in this how constantly does every one fail, how obscure are the symptoms, how uncertain the pathological state! Then from physiology we learn what the effect of this condition must be—how far the various functions must be damaged by it; but how much of this is guess-work! Lastly, our knowledge of therapeutics suggests something which may modify the condition known to us pathologically, on the function which physiology teaches us is disturbed, and we endeavour to fulfil one or both of these intentions, unfortunately very often with but little success. Such as it is, however, it seems to me that this deductive system of treatment holds a much higher place than that which rests only on certain empirical laws, and is very much more philosophical and trustworthy than the lower form of empiricism which claims no higher guide than mere experience.

"The numerical method has not yet been applied to any great extent in therapeutical inquiries. The difficulties attending its employment are so great, and the method itself so open to fallacy, that the results are not likely to be very available for scientific purposes. There are, however, two ways in which it may contribute to the advancement of knowledge. First, as preparing the way for induction, by the collection of facts, which exhibit such a marked preponderance in the influence of one particular circumstance, that there seems every probability of the existence of a relation of causation which we may successfully explore. Secondly, in showing the relative power of two or more agents which have been regarded as alike influencing one particular organ. I think it will also be admitted, that we are better able to judge of the fruits of experience when they are tabulated in a statistical form, than when merely stored up in the memory, even if we receive with a certain amount of caution the inferences derived from them.

> "Experience will always hold a high place in the estimation both of the practitioner and the public. Scientific knowledge is of the first importance in the process of education, and without it the information that certain remedies are proper to be used in certain diseases will be valueless; but yet the nice adaptation of means to ends can only be gained by inference; and the tact with which remedies are administered in analogous instances will often make up, or even more than make up, for great ignorance of the reason why they are employed. Didactic teaching describes the symptoms of disease, and lays down the rules how they should be met by treatment; but we must not forget that, while these are symptoms of disease, they are also actions or functions of living organs, and that remedies are not measured by chemical equivalents, but by the actual condition of the patients on whose organs they are to produce their effects. Most men as they advance in years learn to rely more upon their experience, and less upon their previously acquired knowledge, because of the infinite variety of forms which the same disease presents in different individuals. Shades of difference which can scarcely be expressed in words, are at once recognised by the eye, the ear, the hand, educated by long experience and observation; and scientific principles seem almost to merge in the application of the rules of art. When thus employed, an enlightened experience really marks out the accomplished physician, and serves as the best guide in the practice of our profession."

As to the opinion, founded on experience, of the action of certain medicines in certain diseases, he remarks:

> "Whatever estimate may be taken of the value of such experience, the mere fact of its having been, to a certain extent, universal (such as the administration of saline draughts in fever), has given it a character very different from that which so often assumes the name among us. There seems to me to be no argument more fallacious or more opposed to sound inductive reasoning than that which asserts the curative power of a remedy, because in ten, twenty, or even a hundred cases, recovery followed its administration; and yet this is what is commonly meant when experience is appealed to. It is much to be hoped that scientific medicine may ere long be delivered from this, the oldest, the most obstinate, the most universal fallacy, which has in all ages hindered more than any other the progress of knowledge, and has been the constant theme of logicians of all times—the *post hoc ergo propter hoc;* the belief that a sequence necessarily implies a relation of cause and effect; and this not only in cases where the constancy of the association is so great as to strike the least observant, but where it has happened only in a few cases. Three or four rapid recoveries after the employment of a certain drug are, I might almost say, universally cited by the correspondents of medical journals as distinct evidence of its beneficial agency."

In conclusion, as an instance of the most striking kind of the abuse of the inductive and deductive method of reasoning, we beg to refer to the notice which will be found in this number of our Review of Dr. Benoist's 'Essai sur la Médication Isolante.'

ART. II.—*Etude Clinique sur divers Symptomes Spinaux observés dans la Fièvre Typhoïde.* Par le Dr. E. FRITZ, Lauréat (Médaille d'Or) des Hôpitaux et de la Faculté de Médecine de Paris, Membre de la Société Anatomique, &c.

A Clinical Essay on the different Spinal Symptoms observed in Typhoïd Fever. By Dr. E. FRITZ, &c.—*Paris,* 1864. pp. 164.

As the title of the work indicates, its author attaches more importance to certain symptoms occurring in the disease treated of, referrible as he believes to the cerebro-spinal axis, than any preceding writers have admitted.

His essay is divided into eight chapters. Their enumeration will give our readers some idea at least of the systematic manner in which he discusses the subject.

The first chapter is historical, introduced for the purpose of showing that spinal symptoms in typhoïd fever have been too much viewed as merely accidental complications. The second contains an analytical detail of symptoms under two heads or divisions—the description of symptoms of deranged sensibility and of disturbed motive function, traceable to the spinal chord; the other of symptoms referrible to the medulla oblongata. The third is on the morbid anatomy of the disease, which is briefer than could be wished, and least satisfactory. The fourth is devoted to spinal symptoms specially in relation to typhoïd fever. The remaining four chapters are *seriatim* on the etiology, diagnosis, prognosis, and treatment of the disease.

Viewed as a whole, we have formed a favourable opinion of the work, so much so that we have no hesitation in saying that it is highly creditable to its author as an observer and logician, and that it reflects credit on the illustrious Parisian school from which he has gained his laurels. We especially admire the minuteness and clearness of the description of symptoms, and the caution observed in drawing conclusions, Dr. Fritz availing himself of the most advanced physiology in the discussion of obscure points of pathology. We can thus heartily recommend the work as a study to all earnest students, as we all ought to be *usque ad finem,* with the assurance that a careful perusal of it will well repay the labour; and, in proof of the opinion we have thus expressed, we offer a translation of the concluding portion, in which the results of the inquiry are given with more than ordinary fulness:

It follows (he says) from the facts which we have stated, that the spinal cord is more or less subject to disturbance in a large number of instances of those attacked with typhoïd fever, and at different stages of the disease.

In its prodroma, and at the beginning of the first week, the spinal symptoms are seen to be light, and yet are easily observed in more than a moiety of the cases.

These symptoms are lumbar pains, in all respects like those which so often commence an attack of variola, occasionally, as in that malady, accompanied by a partial paralysis of the lower extremities, or more frequently by cutaneous and muscular hyperæsthesia; painful shootings in the limbs; rachialgic pains more or less intense in the dorsal region; a pain often severe in the back of the neck, radiating to the occiput, interfering with the motions of the head and neck, and sometimes attended by pains of the inferior extremities and a feeling of stiffness of muscles; lastly, great sensibility (spinal hyperæsthesia) from pressure on the spinal apophyses in the aching parts.

These symptoms are not more inconstant than the majority of those which form a part of the general description which is commonly given of typhoïd fever; it is right, then, that they should not be omitted.

They usually continue to the middle or end of the first week, when they disappear; as likewise, in a large number of cases, the cerebral symptoms, which at first occurred, now cease, or a little later.

But it is not always thus: the spinal symptoms, as well as those of cerebral disturbance, may attain even from the incipient attack an unusual intensity, then increase in number, be variously associated, and take a more decided rank in the total of the phenomena, and persist to an advanced stage of the disease.

From the most simple to the most complicated cases, there is in relation to these symptoms a series of insensible transitions, and it results from the autopsies which have been made, and from the clinical analysis, that even in the cases in which the spinal symptoms have attained an unusual violence, no proof is afforded of the presence of myelitis or of spinal meningitis accidentally complicating the fever. At most, only in a very limited number of instances can the spinous symptoms be referred with any strictness to a congestion of the membranes of the spinal cord.

It may be affirmed, too, that most commonly the spinal cord and its membranes are not the seat of any appreciable material lesion.

The symptoms in question are not accidental complications, more than the cerebral symptoms are in those cases in which they acquire an exceptional intensity; consequently, if we allow of a cerebral variety or form of typhoïd fever, we should, to include the class of symptoms above described, accept a spinal variety, thereby indicating a predominance of spinal symptoms. These symptoms are not the only ones which belong to the spinal varieties of this fever.

The phenomenal tableau of these varieties comprehend almost entirely the semeiotic of the spinal cord.

Amongst the alterations of sensibility, first should be mentioned cutaneous hyperæsthesia, extending over a considerable portion of the body, sometimes to the four extremities, and to the trunk and neck, accompanied often with muscular hyperæsthesia; next, spinal hyperæsthesia, reaching from the atlas even to the sacrum; then, in decreasing frequency, rachialgia, with painful radiation to different parts of the body, insupportable pains in the lower extremities, rarely in the superior; violent pains in the chest; pains in the waist; neuralgic pains, bilateral and symmetrical; abnormal sensations of cold, formications; a sense of pricking along the vertebral column, and in the members; cutaneous analgesia, and anæsthesia; muscular anæsthesia.

The derangements of the motor functions of the cord are not less various: paralytic symptoms, numbness of the extremities, paraplegia, partial paralysis of the respiratory muscles, constipation, retention of urine, paralysis of sphincters, spasmodic symptoms, spasmodic dysuria, spasmodic or convulsive contractions of the respiratory muscles, or of the muscles of the extremities, rigidity of the muscles of the neck, contractions of the extremities.

Here perhaps might be introduced with propriety symptoms of a tetanic kind.

To this sketch it is proper to add a special group of symptoms originating in the medulla oblongata, such as extreme dyspnœa, independent of any affection of the voice or of the respiratory muscles, spasm of the pharynx and larynx, convulsive cough, aphonia, alalia, masticatory glossoplegia, spasmodic or rhythmic contraction of the sterno-mastoïdeus and trapezius muscles, paralysis of the pharynx.

The spinal varieties of typhoïd fever are rarely unmixed; they are often enough accompanied by cerebral, thoracic, or other phenomena of great intensity.

Of these complications, as regards diagnosis, the most important is the coincidence of the spinal form with grave cerebral symptoms (the cerebro-spinal variety of M. Wunderlich.) It is amongst infants and young women, and individuals labouring under anæmia, that the spinal cord appears to be more especially affected in typhoïd fever.

The spinal varieties of the disease have generally been observed, but not always under these conditions. It does not appear that hysteria conduces to them.

The spinal symptoms are of irregular occurrence; at times, they are rarely witnessed; at other times they are frequent, and of great intensity.

The severe spinal and cerebral forms are more prevalent when the disease is epidemic than when sporadic.

The study of the symptoms of the spinal varieties of typhoïd fever is of the highest importance in relation to diagnosis. Owing to a want of knowledge of these deceptive varieties, typhoïd fever has not unfrequently been mistaken for spinal and cerebro-spinal meningitis, and this even by individuals of much experience in clinical practice.

Such an error may almost always be avoided by marking the absence of harmony in the different functions of the cord; the integrity of some of these functions contrasted with the profound perversion of others; the mobility of symptoms, their irregular succession; the expression of the face, the nature of the delirium, epistaxis, gastric troubles, iliac pains, diarrhœa; the outbreak of lenticular rose-spots, sibilant râles.

The spinal symptoms of moderate intensity nowise seem to differentiate typhoïd fever from various acute maladies, which may simulate it at the beginning.

The prognosis of the spinal forms, and especially of the cerebro-spinal, is almost always serious, and most of all in adults. The mortality in these cases is great, the duration is generally long, and paralytic or other accidents are not uncommon sequences.

Symptoms implicating the medulla oblongata always require a very guarded prognosis; and dyspnœa, with extreme depression at the beginning, without pulmonary complication, denote almost always a speedy and fatal termination.

The spinal symptoms of typhoïd fever never, *per se*, require blood-letting: the contrary is mostly indicated. When the symptoms are threatening, dry cupping or scarifying should be applied along the course of the spine, with cutaneous revulsives, stimulating baths, cold lotions, and repeated purgatives.

Belladonna given internally may perhaps be useful, whilst all the preparations of opium appear to be contra-indicated.

Lastly, as palliatives, topical emollients and anodynes may be of some service.

Art. III.—*Contributions to Sanitary Science.* No. I. *The Case of the Journeymen Bakers: being a Lecture on the "Evils of Night-work and Long Hours of Labour."* By William A. Guy, M.B., F.R.C.P., &c. Third Edition.—*London*, 1865. pp. 30.

The journeymen bakers have found a powerful advocate in Dr. Guy, and we are glad to find from the advertisement to this third edition of his lecture (a lecture delivered at the Mechanics' Institution, Southampton Buildings, in 1848), that his animadversions on their then wretched condition have had some effect in diminishing the many evils to which they were exposed; so that, to some extent, the making of bread has been changed from "a handicraft to a manufacture."

According to the best information attainable by Dr. Guy, the number of this class of workmen employed in preparing the staff of life for the two millions of the inhabitants of London is about 12,000, with their families making a total of about 25,000, the master-bakers being about 1200.

The condition of these workmen in all its circumstances as described by the author was at the time such as to be, if not well authenticated, hardly credible. Their labour was almost entirely at night; the hours of labour averaged from eighteen to twenty; it was carried on in underground cellars, ill-ventilated, ill-drained, mostly in a fœtid atmosphere, accompanied with abominations which cannot be described in a few words; in brief, we have no hesitation in saying, that had invention been specially exerted to contrive a state of things most unsanitary, most conducive to disease and the shortening of life, it would not have been an easy task to have brought into operation more deleterious causes, or to have intensified those to which the journeymen (a term most inapplicable) were exposed.

As might be expected, the malady to which they are most subject is that fatal and commonly lingering malady, pulmonary consumption. Eighty in the hundred are stated to suffer from chest-complaints; and of these, phthisis is certainly the predominant one. That they should be short-lived, therefore, might be anticipated. Dr. Guy assigns forty-seven years as their average age at death; according to a document put forth by themselves, it is only forty-two. To them, therefore, the Chancellor of the Exchequer's boon, recently held out to the working class, of an annuity of six shillings a week after sixty, for life, by paying one shilling a week from thirty to sixty, would be very like a mockery. It might be supposed that the wages of these journeymen would be high, considering the hard, unnatural, unwholesome life they were subjected to; but this was not so; it averaged no more than fifteen shillings a week, and was often lower. It may seem strange that men so poorly paid would submit to such evils. We can only account for it on the idea that bread-making in a handicraft way is soon learnt, and that the supply of labourers is, or was, greater than the demand. It seems more strange that in a Christian country, boasting of its humanity and advanced civilization, the Legislature should have so long allowed the men to be so oppressed. Dr. Guy offers an explanation of this, founded on the principles of the free-trade economists, that the Government should not interfere with labour. He, we think, most justly deprecates what he holds to be—and we heartily agree with him—an abuse of the principles. By a like abuse, we may remark, the abolishing of the differential duties on sugar gave encouragement to the extension of slave-cultivation in the Spanish West India colonies, and the riddance of the duty on American cotton occasioned the extinction of its culture in our own colonies; the consequences of each of which measures—these so remarkable—we need not point out.

We regret to find that when an attempt was made in Parliament to alter the time and reduce the number of hours of labour of the journeymen bakers, it was resisted even by Mr. Gladstone, he being reported to have said, that to grant the request made would be to do an act "abhorrent to the genius of the constitution." Dr. Guy's comment on this is good, and worthy of his humane profession:

> "I for my part," he says, "do not profess to know much about the 'genius of the constitution,' but I have always looked upon the constitution of these realms as a mixed constitution, in every sense of that term—a constitution in which mercy tempers justice, and considerations of moral expediency are wont to triumph over abstract theories, however true in themselves—a constitution which is the practical exponent of that great Christian principle of our common law, which bids us *so use our own as not to injure others*, and which must be a mockery and a snare if it cannot be made to mean that the employer shall not abuse his privilege of capital to the ruin of the health, the destruction of the lives, the wreck of the happiness, and the imminent danger of the temporal and eternal well-being of the employed."

We have adverted to the abuse of the term *journeyman baker*: Richardson defines a journeyman "formerly one who worked by the day, journey-work, daily work," derived from the French, *journalier.* It is lamentable to reflect that the definition should now be so qualified, and that so many classes of labourers, besides bakers, are hard at work when they should be at rest in their beds, to the injury of their health, and too often of their moral and intellectual being. During the time of slavery in our West India colonies, the employment of night-labour during crop-time was not spared animadversion by the advocates of emancipation: so soon as slavery was abolished, the night-work was generally given up, and, as the planters found, to their advantage, the night-work being always careless and bad work.

This lecture of Dr. Guy's is announced as No. I. of "Contributions to Sanitary Science." We hope he will keep his promise and favour us with others, written in the same spirit and with the same scope. The field is an ample one, especially as regards the time and hours of labour. England is no longer in some respects the merry England of old. The time was when the day was for labour, the night for repose. So it is at present in the East. Take Constantinople, with its Mahommedan population, as an example: there, with sunset throughout the year, the bazaars are closed, the artificer quits the workshop for his home, and a general quietude prevails—strongly contrasted with what we witness in our cities, whether in their great thoroughfares blazing with light from shops and gin-palaces, or in manufactories illuminated with gas. Are we not justified in saying, that Mammon is with us an all-powerful and unrelenting taskmaster? And we will add, were we compelled to compare the East with the West, the olden time with the present, to make a choice, we might hesitate to which we should give the preference, at least for the majority of the people, the great working class, excluding the well-to-do, the well-educated and the opulent, always the minority.

ART. IV.—1. *The Ophthalmic Review: a Quarterly Journal of Ophthalmic Surgery and Science.* Edited by J. ZACHARIAH LAWRENCE, of London, and THOMAS WINDSOR, of Manchester. Nos. 2, 3, 4.—1864–65.

2. *The Journal of British Ophthalmology and Quarterly Report of Ophthalmic Medicine and Surgery.* Edited by JABEZ HOGG, Assistant-Surgeon, Royal Westminster Ophthalmic Hospital. No. 1.—1864.

3. *Eighteenth Report of St. Mark's Ophthalmic Hospital and Dispensary for Diseases of the Eye and Ear.—Dublin,* 1863–64.

IN our Review for October we noticed, and with much hope of its usefulness, the first number of the 'Quarterly Ophthalmic Review.' We have now before us the subsequent numbers. From the titles of the contents of each number, and more especially from the names of the contributors, we have little doubt that our hope will not be disappointed, should the editors receive sufficient encouragement to continue its publication.

With this feeling as to the question of its having sufficient support from the profession, we were a little surprised that another ophthalmic quarterly journal should have been started, of which the first number, that for October, is the only one we have received.

It is our duty to endeavour to be impartial. From such an insight as we have had of it, we must hesitate in expressing unqualified approval. In running over its pages, one feature immediately arrested our attention—personal remarks affecting professional character, which are always to be deprecated, and which, if allowed to have a place in future numbers, must vitiate any good which otherwise might be effected by it. Its leading article, too—the first of the number—we have read not with perfect satisfaction. Its title is "British and German Ophthalmologists. Iridectomy and Section of the Ciliary Muscle." The writer of it boasts of the superiority of British ophthalmic surgery over the German, which latter, he is of opinion, has been unduly exalted in this country. Yet, were we to judge from the character, which he gives in somewhat stilted language, of the oculists of the capital, the conclusion we must arrive at would be the contrary to his, and not in favour of the latter, especially if viewed in relation to morals and that integrity which constitute the distinctive mark between science and quackery. There is an honourable rivalship deserving of all praise, and an honest criticism ready to give honour wherever honour is due, irrespective of nationalities, the opposite of a carping, detracting one, strenuous only in finding fault. The remarks of the author, when he treats of iridectomy and section of the ciliary muscle, seem to us to belong to the latter rather than the first mode of criticism, and deserving of deprecation accordingly. We would refer him to the January number of the 'Journal de Médecine et de Chirurgie Pratiques' for some judicious observations, as they appear to us, made by M. Wecker on that operation of Mr. Hancock, of which he expresses so high and unqualified an opinion. Specialists are always *in danger of* running into excesses and of magnifying preposterously the subjects which have their attention. When we reflect on this, we are half inclined to regret the existence of such a class of practitioners, and that there are journals solely devoted to their labours. But we must be content, as with most earthly things, to take the evil with the good, hoping that in the long run the good will preponderate.

Instead of a comparison of British and German ophthalmology, we had rather that the editor of the new journal had given us a statistical paper on ocular diseases in Great Britain. An account of them, if attainable, distinguishing the different varieties, would be highly interesting and instructive, and, we apprehend, would tend to show the comparatively little importance of these ailments, the rare ones, on which in ophthalmic journals so much is written.

From the Report of the excellent institution which is named in the heading of this article, we learn that, according to the last census returns, those of 1861, for Ireland, there was in that country 1 blind in every 843 persons, the number totally blind being 1861, partially

1209, and suffering from ophthalmic diseases 1962; of the latter of whom 457 were under fifteen years of age, 324 were from fifteen to twenty, 662 from twenty-five to fifty, and 519 were over fifty years.

From the Report we find that of the total number of diseases of the eye registered and treated in the hospital of St. Mark's and the Dispensary during the year—viz., 1709—there were only 4 cases of glaucoma returned, and of those admitted into the house there were 8 only of iritis and of internal ophthalmia.

In the same document, a deficiency in medical education is pointed out, and very properly insisted on—"the want of compulsory education in ophthalmic diseases in curricula prescribed by the various licensing bodies in the British Isles." Until this want be rectified, we fear that the knowledge of these diseases will be limited, too much restricted to professed oculists, and as a consequence, except in large towns, where oculists can flourish, such diseases will be more or less neglected, and as in Ireland, the effect of that neglect will be witnessed in the large proportional number of the unfortunate blind. Moreover, without a diffusion of elementary knowledge of diseases of the eye, even periodicals exclusively devoted to them, must be of partial and very limited use.

ART. V.—*Essai sur la Médication Isolante, ou Traitement des Inflammations en général par les Enduits Imperméables, avec des Observations Clinique, à l'appui, suivi de quelques Considérations sur la Nature et le Traitement de la Fièvre dite Puerpérale.* Par le Dr. FERDINAND BENOIST, Lauréat de l'Ecole de Médecine de Poitiers.

An Essay on "La Medication Isolante," or the Treatment of Inflammations in general by Impermeable Applications, with Clinical Observations in its favour, followed by some Remarks on Puerperal Fever. By Dr. F. BENOIST.—*Poitiers*, 1864. pp. 62.

THE author of this pamphlet has, from his own experience, taken a very favourable view of the mode of treatment indicated in the title of his essay. He adopts for his motto the dictum, that pathology to be successful must be founded on physiology—"La pathologie arrivera à pouvoir se greffer sur la physiologie." Accordingly, he connects the treatment which he advocates with the researches of Foucault on the respiratory function of the skin, referring the discovery of it to Dr. Robert Latour, who, having been impressed by the coincidence of an increase of temperature in the portion of integument subject to inflammatory action, wherever situated and of whatever degree, came to the conclusion, that by protecting the part from the agent essential to the production of animal heat—viz., atmospheric air—the inflammatory process might be arrested.

This conclusion, the result of such induction, Dr. Benoist holds to be the finest discovery ever yet made in therapeutics, and, as he thinks, one amply verified by experience, and yet one that would have remained unfruitful had not chemistry, by furnishing collodion, supplied what was wanted—namely, an impermeable covering.

Having passed his eulogium on this novel method, he expresses his astonishment at the attempt made to suppress it by ignoring it, or in other words, and they are his, by a conspiracy of silence.

He endeavours to show that, instead of being opposed to the best established facts in medical science, it is in perfect harmony with them, and affords aid to their explanation, instancing the beneficial effects of the exclusion of air in a variety of external injuries and superficial phlogoses. He appeals, lastly, to the state of medical science, encumbered by a number of facts without a connecting link—in a word, waiting the advent of a Newton; and he asks whether that connecting link is not to be found in the doctrine which associates inflammation with animal heat? That this doctrine is true is his faith, his absolute faith, and that a revolution in medicine will be produced by its development. After further eulogy, he proceeds to the practical part of his subject, and describes how collodion should be used—a substance which, besides impermeability, possesses the two qualities most required, adhesiveness and a certain degree of elasticity.

Next, he gives in detail the results of his own experience comprised in twenty instances of various ailments:

> "1. Contusion and sprains. 2. Erysipelas of the face quickly subdued by a covering of collodion. 3. Circumscribed phlegmon. 4. Phlegmonous erysipelas of the leg. 5. The same disease thrice arrested by the sole use of collodion. 6. Diffuse phlegmon of thigh and leg. 7. The same affecting the thigh and sterno-clavicular region, complicated with acute articular rheumatism. 8. Lymphangitis, erratic erysipelas of inferior extremity, and inflammation of a bursa mucosa. 9. General phlebitis. 10. Phlegmasia dolens. 11. Acute metro-peritonitis. 12. Acute peritonitis occasioned by an ovarian cyst. 13. Ovaritis, accompanied by a pelvic phlegmon, with suppuration after the use of bad collodion; three years after, a repetition of the ailment successfully treated by the application of collodion of a good quality. 14. Chronic peritonitis. 15. Periostitis. 16. Zona. 17. Milk-engorgements. 18. Adenitis. 19. Acute articular apyretic rheumatism. 20. Acute rheumatism of knee, with fever. 21. Poly-articular acute rheumatism with endocarditis."

In addition, the author states a case of supposed strangulated hernia, in which he says relief was obtained by the use of collodion: he appends a supplement of some other cases of diverse ailments, accompanied with remarks expressive of the efficacy of collodion in inflammatory cases. Such are his results generally; according to him, however, they have been aided in the greater number of instances by other modes of treatment.

Dr. Benoist concludes with the following propositions explanatory of medication by isolation:

> "1. Motion is the result of the action of forces—electricity, light, caloric, magnetism, &c.
>
> "2. Life is the general result of motion.
>
> "3. Individual life or being is the result of circumscribed motion with a determinate end.

"4. Health consists in an equilibrium of forces which enter into the composition of being.

"5. Disease is a disturbance of the equilibrium, or in other words, an alteration of the forces one with another, whence a material alteration results.

"6. Inflammation is nothing more than an exaggeration of persistent motion occurring in one or more parts of the body, under the influence of an excess of caloric.

"7. Isolated medication is a means of preventing or checking such an exaggerated motion by the exclusion of the contact of the elements unexceptionably necessary to the production of animal heat."

We hardly know whether we are justified in giving so full an account of Dr. Benoist's paper. He is evidently an enthusiast; but how few are the discoveries which would have been made without this noble element of the human mind!

In considering his hypothesis, there are two questions which require to be answered: 1. Is the basis of it, the views of M. Foucault, relative to cutaneous respiration, correct? And 2. Whether, if so, the observations of the author suffice to support the doctrine founded on them? As to the first, we are not aware that the results of the researches of the physiologist made some twenty years ago have been confirmed; or, even supposing their truth to be established, it would follow that animal heat in any way depends on the action of oxygen on the skin. As to the second, granting that in many instances the application of collodion may have been serviceable, it far from follows that it should be so marvellously useful as Dr. Benoist believes.

It has been said that anything may be proved by statistics; is it not also true that the inductive method may be equally abused—i.e., by an array of cases, such as those enumerated, in which the result has been favourable, using a peculiar mode of treatment? There is no drug which has not in its turn effected wonders. How few are the ordinary ailments which, if not interfered with, would not in due course terminate in health! Great is the efficacy of the restorative power of the *vis medicatrix!* We remember having our attention directed to a famous and boasted styptic, the "aqua Binelli," which it was boldly asserted, and by some medical men of good repute in Naples, had the property of arresting hæmorrhage even when large arteries were divided, and the results of experiments on goats were cited in confirmation of its efficacy. On examining this precious fluid, which was sold at a high price, it was found to differ from water merely in being flavoured by tar or creosote. The experiments were repeated, mere water being substituted (wet pledgets being so applied as to make gentle pressure, not to obstruct the flow of blood through the divided vessels), and the result was equally successful.

We think it highly probable that collodion may be of much service in every case in which the exclusion of air is indicated, and also in every instance in which it is an object to defend adjoining parts from irritating discharges; but these are humble uses compared with the functions assigned it by our author, and explained in his transcendental concluding propositions.

ART. VI.—*Practical Observations on the Hygiene of the Army in India, including Remarks on the Ventilation and Conservancy of Indian Prisons; with a Chapter on Prison Management.* Illustrated with Woodcuts. By STEWART CLARK, M.R.C.S. Eng., Inspector-general of Prisons, North-west Province, India.—*London*, 1864. pp. 162.

THOSE who devote themselves to any particular inquiry are apt to form exaggerated views in connexion with it. We make this remark not being sure that the author of the work before us does not in some of his opinions and statements expose himself to such a charge, especially where he treats of air, of impure air, being the cause, and the main cause, of tropical diseases. Etiologically, he gives it precedence over water, and so far he may be right. That pure air and good water are essential to health does not admit of doubt—the question is as to the special effects of both when impure. The subject is a vast one, and of the first importance. Mr. Clark, we think, in many instances has failed to be guided in his remarks and conclusions by the largest available experience and the best lights of science. We cannot agree with him that cholera is chiefly owing to bad air, in the ordinary acceptation of the term. Did it not depend on a specific cause, were it owing to a cause, such as vitiated air, the result of crowding and neglect of cleanliness, it ought to have been constantly endemic, and not only in India, but in England, and, indeed, in most parts of the world where sanitary measures, including due ventilation, are neglected. He seems to have forgotten the early history of the disease, its sudden outbreak, now nearly half a century ago, in Upper Bengal, in the camp of the Marquis of Hastings, and its then rapid spread in the East, gradually reaching Europe, and appearing in localities the inhabitants of which at the time were in their average state of health. So long as we are ignorant of its *vera causa* (and the same remark is applicable, we regret to think, to so many more diseases), we ought to be careful in speculating on its origin, and in proposing measures for its prevention.

Though Mr. Clark is of opinion that water has rarely, if ever, been the medium by which cholera has been generated, and that the organ by which the *materies morbi* is introduced is not the stomach but the lungs, yet he considers it capable of generating disease by the noxious gases which it may absorb. This notion does not appear to us warranted by exact science; proof, we think, is wanting of any such gases being absorbed by water; and, even on the supposition of such an absorption, proof is needed of such gases being evolved; the absorbing and evolving are opposite processes. Besides gaseous and organic poisons in water, Mr. Clark assumes that it often contains inorganic noxious elements; he enumerates as such sulphate and carbonate of soda, chloride of sodium, sulphate and carbonate of magnesia, nitrates of potash and soda, &c., "derived," as he says, "from the early geological formations and the soil which it percolates." Water after this manner impregnated, he asserts, will "act as an active poison." This, too, as it seems to us, comes under what we think an extreme view. If water be strongly impregnated with the saline matters mentioned, it would offend the taste and be refused; or, if drunk from necessity, would probably act merely as a purgative. Hard waters which owe their peculiar quality to the earthy salts which they contain, are not most desirable for use; there are many objections to them, but it is not accurate to speak of their action as poisonous. As regards the effect of hard water on health, we have no hesitation in saying, that we think too much importance of late years has been assigned to this quality, and that often fairly wholesome water has been objected to, and great expense has been incurred, because the water of a selected locality for a public building—a prison, for instance, or a lunatic asylum—has held carbonate of lime and a little sulphate of lime in solution, less, we believe, than exists in the drinking water with which many of our cities are supplied.

If there are some particulars in Mr. Clark's work to which we cannot give our assent, there are others concerning which we perfectly agree with him. His remarks on "food," the soldier's rations, are very judicious, both as to quantity and quality, and mode of cooking—the quantity being unnecessarily large, the quality commonly inferior and not always wholesome, and the cooking rude, dirty, and every way bad. He describes the daily ration in India as consisting of meat 1 lb., bread 1 lb., vegetables 1 lb., rice 4 oz., sugar 2½ oz., tea or coffee 1¾ oz., salt 1 oz., firewood 3 lbs. Is it surprising, when our troops are not actively employed in the field, when leading an indolent life in cantonments, that hepatic and other diseases of the digestive organs should be prevalent amongst them! He well remarks that the most abstemious men in India are the healthiest, and that in the higher ranks of society there has been a great improvement in the health of its members since the disuse of the heavy luncheon, the "tiffin."

On the subject of useful employment for the troops he offers some excellent suggestions, prefacing them with the remark, that "in former times soldiers were not less brave, or fought and conquered with less success, or bore the fatigues of campaigns with less endurance, because they made roads and executed other military work when not required for actual fighting in the field." To preserve sound health in every climate, and especially in a hot climate, exercise, the avoiding of slothful habits, is as essential as temperance. We are glad to find that gardens at many of the military stations in India are cultivated by the men. Labour in them—the moderate labour required—must prove a diversion, rather than an irksome toil, be a help to break the monotony of barrack life, and good for the mind as well as the body; and in an economical point of view as well as sanitary, of no mean importance.

The most considerable portion of Mr. Clark's work is that relating to the great subject of the hygiene of the army of India, and treated of under various heads of Ventilation, Drainage, Conservancy, Supervision, &c. His practical remarks, supported by his own experience on all these subjects, are deserving of attention, as also those on prisons, prison discipline, &c., and we hope will have the attention of the Government. Occasionally, as it appears to us, he over-refines and attempts too much. His schemes for improvement are designed almost exclusively for the stations hitherto occupied by our troops, where they are exposed to most of the bad influences of an Indian climate. Were a better selection of permanent stations made, such as have been often recommended at certain elevations where the nights are always cool, where the heat by day is never excessive, and where malaria is little known, there would be little need of the elaborate machinery and costly contrivances for ventilation and reduction of temperature proposed by him. In such positions the health and vigour of our regiments would have the best chance of being preserved; nor would their efficiency, it is presumed, be compromised should their service in the field be needed, now that the system of railways and of telegraphic communication has been so much advanced.

We must not part from our author without recommending his work to all who have a voice or influence in Indian administration: to them it seems specially addressed, and to them in its practical views it is likely to be most useful.

ART. VII.—*On Long, Short, and Weak Sight, and their Treatment by the Scientific Use of Spectacles.* By J. SOELBERG WELLS, Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, the Middlesex Hospital. Second Edition.—*London*, 1864, pp. 214.

THE recent notices we have given of this valuable work would in ordinary cases be reason sufficient why we should not advert to this fresh edition of Mr. Wells's book; but not only is this a genuine second edition demanded by the rapid sale of the first, but there are additions and elucidations of such importance as to call for a brief criticism from us.

We would particularly draw the attention of the profession to the chapters on Muscular Asthenopia and Astigmatism, pp. 106–137, and 178–198.

The first of these is full of close analysis, accurate deduction, and sound practice; and bearing, as it does, on that large class of overworked students and literary men, careworn, ill-fed, under-paid sempstresses, whose dependence for their daily bread is on their eyes, it is difficult to overrate the importance of the subject, especially as an adequate remedy for the majority of the cases is at hand.

The existence of muscular asthenopia is of very frequent occurrence among the young, especially girls, who, lacking the invigorating sports and exercises of their brothers, are nevertheless set to tasks requiring more prolonged and constant use of the eye under less favourable conditions of general health; and this leads either to strabismus or permanent impairment of vision.

Mr. Wells would have done well to have alluded to the necessity of sounder hygienic practice and general constitutional invigoration as material elements in the treatment of asthenopia, but he may deem it more fitting matter for his lectures on general ophthalmic practice in his new position at King's College—a position on which we congratulate both the College and Mr. Wells.

The subject of astigmatism is a far deeper one; and though recognised by that grand philosopher, Dr. Young, seventy years ago, has only of late received its proper recognition and assumed its due importance in many cases of amblyopia, hitherto deemed incurable. Much confusion has existed between that form of astigmatism caused by a peculiarity of structure of the lens, and that which depends on conditions of the cornea; but Mr. Wells, following the lead of Donders, has cleared this up, and rendered the distinction facile enough for those who have mastered the subject of accurate optical investigation. Without this previous knowledge the chapter is difficult to comprehend, and the difference between simple and compound, congenital and acquired astigmatism, impossible of recognition.

The perusal of Professor Longmore's 'Manual of Instructions for Army Surgeons in distinguishing Defective Vision in Soldiers,' must strike every one as a sample of the great advance in high scientific knowledge in these matters, and the increased acquirements which all military surgeons must now possess.

In Mr. Wells's book will be found the very grammar and foundation of this learning, and we can recommend this second edition as the best and most comprehensive work on this subject in our language.

ART. VIII.—*Clinical Lectures and Reports by the Medical and Surgical Staff of the London Hospital.* Vol. I.—*London,* 1864. pp. 510.

THE substantial, handsomely-bound volume before us is nominally edited by Dr. Andrew Clark, Dr. Down, Mr. Hutchinson, and Mr. Maunder. As the title indicates, the work is a collection of papers by members of the London Hospital School; and the clinical observations of which the papers are the record, have principally but not entirely been made within the walls of the hospital.

The first paper, by Dr. Herbert Davies, is an account of a case of aneurysm of the innominate and subclavian arteries. The interest of the case hinges on the fact, that the treatment by application of ice had *almost* produced complete coagulation of the contents of the sac. Had it been continued, there is every reason to suppose a cure might have been effected. Dr. Davies contributes another interesting paper, in which he makes out a fair case for the application of blisters to the joints in acute rheumatism, his idea being that the *materies morbi* (lactic acid ?) is thus withdrawn from the system.

Mr. Jonathan Hutchinson gives proof of his industry in clinical research in several papers on varied subjects—viz., 1st. On Leucoderma. The diagnosis of this disease from so-called Morbus Addisonii and Pityriasis versicolor is clearly indicated and illustrated by eight cases. 2nd. On

Elephantiasis Græcorum, which the writer regards as a constitutional affection more or less allied to tuberculosis, and probably originating in the first instance in some peculiarity of diet. 3rd. On a Form of Cerebral Amaurosis, which, from the careful analysis of a series of cases, the author believes to be related to tobacco-smoking as an effect. 4th. On Relapsing Pemphigus, for which Mr. Hutchinson believes arsenic to be a specific remedy. A number of cases are adduced which certainly bear out this conclusion. We cannot, however, agree with Mr. Hutchinson in doubting the existence of pompholyx or pemphigus solitarius, as we have now under our care a young lady, in whom one solitary bleb, having all the characters of pemphigus, appeared on the outer side of the foot. No other blebs have as yet followed, ten weeks having elapsed since the bulla appeared. In another paper, entitled Extracts from Clinical Lectures, Mr. Hutchinson makes some interesting observations of a surgical character.

From Dr. Down we have two papers, one of them a case of successful treatment of Polysarcia by "Bantingism," the other a tribute to the efficacy of Sesquicarbonate of Ammonia, as a remedy for Scarlet Fever. In reference to the latter, Dr. Down remarks: "The impression I derived from watching these cases was, that the sesquicarbonate of ammonia diminished the febrile state, acted as a sedative on the nervous system, and, without asserting for it a place among the specifics, I may add, that it appeared, when given in the earliest stage, to lessen the severity of the attack."

Besides an introductory lecture on the study of diseases of the nervous system, Dr. Hughlings Jackson furnishes two elaborate and instructive papers illustrative of Nervous Diseases. These papers are of great value, not only as being the embodiment of much clinical research, but as attempts to combine and harmonize the clinical with the physiological method of research. We hope for a further opportunity of referring to them.

In a paper entitled "Gleanings from the Field of Observation," Dr. Andrew Clark communicates various matters of practical importance. The use of the microscope as a means of elucidating the nature of pulmonary disease, is illustrated by cases of tubercular, encephaloïd, and hydatidiginous affections. In reference to pneumonia, Dr. Clark holds that there is no inter-vesicular form of that disease. He lays down some important points in regard to the detection of small quantities of albumen, many of which our own experience enables us to confirm. Thus we have known authorities fail to detect a small quantity of albumen from not observing it some time after the application of heat and nitric acid. Again, we have more than once, in weakly individuals, been able to refer traces of albumen to the presence of minute quantities of muco-purulent secretion which are discharged at the close of micturition. Pus casts of the mucous follicles are frequently present in such cases. Dr. Clark makes other observations of much practical interest.

Space does not permit our noticing at length other and important contributions by Dr. Woodman (to whose diligence, as resident medical officer, many of the other contributors are indebted), Dr. Barnes, Dr. Ramskill, Dr. Powell, Messrs. Maunder, Curling, Cowper, Heckford, and Little. The work should be in the library of every practitioner, not only on account of its own intrinsic value, but because every encouragement should be given to such a praiseworthy effort to make useful to others the benefit which such large opportunities of hospital experience must necessarily afford. We hope, ere long, to see vol. ii. of the 'London Hospital Reports,' and to find that other hospitals will follow the example of Guy's and the London in publishing Records and Reports, and so utilizing material which otherwise is lost or lies dormant.

Art. IX.—*Traité des Maladies du Cœur et de l'Aorta.* Par William Stokes, Professeur Royal de Médecine à l'Université de Dublin, &c. &c. Ouvrage traduit, avec l'autorisation de l'Auteur, par le Dr. Senac, Médecin Consultant à Vichy, &c.—*Paris*, 1864. pp. 716.

We need not describe the contents of the well-known and valuable original to English readers. We would, however, express a hope that this translation may be as well studied across the Channel as it deserves to be; and, indeed, expect it will be so, as in our opinion Dr. Senac has done all in his power to recommend it, and to enable his countrymen to appreciate the labours of its author. Dr. Senac has evidently brought to his task a complete knowledge of the English tongue, and has worked *con amore* throughout. This is indicated by an interesting preface which he has written to his translation—one in which he shows a thorough understanding and appreciation of the teacher whose experience he seeks to make widely known—a teacher whom he describes as follows: "Observateur consciencieux, il cherche la verité avec d'autant plus de chances de la trouver, qu'il ne croit pas à son infallibilité, s'appliquant à lui-meme cette maxime, qu'en médecine surtout, douter c'est apprendre." In the selection of such a subject (one which the profession in France have contributed so much to elucidate), and in this honest and successful endeavour to do justice to the labours and talent of one of our brethren, we cannot fail to recognise in Dr. Senac's translation a compliment of the highest order to the medical profession on this side the Channel.

Art. X.—*On the Growth of the Jaws.* (From the 'Transactions of the Cambridge Philosophical Society,' vol. xi., Part 1.) By G. M. Humphry, M.D., F.R.S., Lecturer on Anatomy and Physiology in the University of Cambridge.—*Cambridge*, 4to. With Plate.

This short paper comes before us as a welcome proof of the continuation of Dr. Humphry's researches into the process of development in the osseous system, and it bears the stamp of original inquiry equally with his previous communication to the Medico-Chirurgical Society, in reference to growth in the long bones—(see vol. xliv. of 'Medico-Chirurgical Transactions.') How do the maxillæ adapt themselves to the progressive enlargement of the structures in their vicinity? By what developmental process do they continue able to perform their gradually increasing functions during childhood and adolescence? This appears to be effected by subtraction of osseous tissue at one part, and by addition of it at another, and would seem scarcely at all to result from any interior or interstitial change. From the first months of life the plan of the jaw seems laid down like the keel of a ship, nor is it at the symphysis, as might be believed, that any process of growth occurs, for this is ankylosed from the sixth to the ninth month of infancy; and even before birth, there is but little development at that point. The part of the lower jaw first formed—viz., that part intermediate between the alveolar and lower edges, retains its original curve without undergoing any change in form; solely, we remark, as the bone increases upwards to the alveoli, and downwards to the lower border, the new part in each of these directions, and more especially below, is thrown a little outwards, and this varies noticeably in the European, negro, monkey, &c. When we place an infantile on an adult jaw, the permanent molars of the adult are in the same line as the temporary molars of the infant. All increase in length seems owing to the absorption of the coronoïd and condyloïd processes in their fore part, and by a gradual addition as well to the posterior part of these processes as to the angle and hinder edge of the jaw. It is in this manner that room is made for the permanent molars. The process is not dissimilar by which the widening of the lower jaw behind the alveolar arch is effected—viz., by progressive absorption at the inner surface of that part, and addition at the outer. If the angle between the horizontal portion of the lower jaw and ramus, from its commencement in a line nearly straight, becomes in time almost a right angle, this results partly from absorption of the coronoïd process in front, and partly from addition to the angle of the jaw posteriorly.

By a law of exceeding beauty, which Dr. Humphry portrayed in his previous paper, an interstitial growth is active in the soft parts, whereby these parts shift and adapt themselves correspondingly to the altered form of the bones; the muscles and periosteum appear to slide along the surface of the bone, so as to be found in undeviating relations to it; only the foramina, especially the mental, in their varied position and shape at different periods of growth, show proof of the slight strain exerted on the vessels and nerves passing to and fro from the bone.

> "In the upper jaw the changes are very similar to those in the lower. The permanent molars, developed behind and above one another in the 'tubercle,' descend and move *backwards*, and the space for them is formed by addition to the hinder part of the tubercle. During this period the contiguous pterygoïd processes of the sphenoïd bone undergo alterations similar to those in the coronoïd processes of the lower jaw—that is, they receive addition behind, and are absorbed in front, and are so rendered more vertical. The molar

eminence of the maxillary bone, and with it the zygoma, are in like manner thrown backwards; and as the bone is deepened by addition to the alveoli from beneath, and as the teeth grow down into the alveoli and become distanced from the orbit, the interval between them and the orbit is occupied by the antrum."

Evidence in proof of these views is drawn from experiments in which Dr. Humphry applied wires to mark the progress of growth in the lower jaw of young pigs, as shown in the plate annexed.

ART. XI.—*Medicinskt Archiv, utgifvet af Lärarne vid Carolinska Institutet i Stockholm.* Redigeradt af E. A. KEY, Professor i Pathol. Anatomi; C. J. ROSSANDER, E. o. Professor i Chirurgi; och A. KJELLBERG, Adjunct i Pædiatrik. Andra Bandet, första Häftet.—*Stockholm,* 1864. 8vo, pp. 178.

Archives of Medicine, published by the Teachers in the Carolinean Institute in Stockholm. Edited by E. A. KEY, Professor of Pathological Anatomy; C. J. ROSSANDER, Professor Extraordinary of Surgery; and A. KJELLBERG, Assistant in Pædiatrics. Second Volume, First Number. With numerous Plates.

WE have, on previous occasions, briefly noticed the three numbers of the first volume of the above valuable periodical. The first number of the second appears with a vast improvement in its paper and typography, is well illustrated with plates, and promises to be the commencement of a very handsome volume. A change has been made also in the paging of the work, each essay having now its own separate paging, the intention being to facilitate the subsequent reproduction of the essays in another order than that in which they appear in the journal.

The first essay in the volume now before us is one by Baron von Düben, Professor of Anatomy and Physiology in the Carolinean Institute, upon "Skulls with Early Ossification of the Sagittal Suture (Scaphocephali)." The author commences by stating, that in the course of his anthropological studies in the rich collection of human skulls contained in the Carolinean Medico-Chirurgical Institute, his attention has been constantly directed to the changes in form which crania undergo in consequence of early ossification of one or other of the sutures, or of several sutures, changes of form which might easily lead to, and have actually led to, mistakes in a craniological point of view. He adds that the results of his researches have been confirmatory of the propositions announced by Virchow;—1. That synostoses of the cranial sutures give rise to diminution of the skull (cranio-stenosis) in a direction perpendicular to that of the obliterated suture; and 2. That in the still open sutures, especially in the direction of the obliterated sutures, a compensating enlargement of the skull takes place. Baron von Düben informs us that—

"Among the different pathological forms of the skull established by Virchow, one, the by him so-called simple dolichocephalic, depending on early synostosis of the sagittal suture, has acquired a certain more considerable importance, in consequence of a couple of essays which have appeared during the last few years. As the collections in the Carolinean Institute present four good examples of this malformation, and as I have lately had the opportunity of inspecting, drawing, and measuring three living persons with this form of skull, I may be permitted to enter more fully into an investigation of the subject than has yet been done." (p. 2.)

Ed. Sandifort[1] was the first to describe a case of this nature; Virchow, in his essay, 'Ueber den Cretinismus,' represents and describes two skulls of this form; and in the 'Dublin Quarterly Journal' for November, 1856,[2] Humphry Minchin, without being aware of Virchow's researches, communicates, in a paper entitled "Contributions to Craniology," a case of the formation in question. Other cases (two) are recorded by J. C. G. Lucæ,[3] two are described by K. E. von Baer,[4] and one is briefly mentioned and is represented by Hermann Welcker.[5]

Having devoted seventeen pages to a review of the literature of his subject, Baron von Düben proceeds to describe the instances of scaphocephali observed by himself, consisting of four crania and of three living individuals. We have already stated that his results are confirmatory of Professor Virchow's views. To some parts of the latter's nomenclature the Baron, however, takes exception; and for the special forms of cranial development in consequence of synostoses at present under consideration, he himself proposes the following terms:

"I. *Megalocephali* (Lucæ) = simple macrocephali (Virchow).
III. *Stenocephali* (Lucæ) = dolichocephali (Virchow).
  a. Scaphocephali (von Baer) = simple dolichocephali (Virchow) = macrocephali (Minchin and Lucæ).
IV. *Syntomocephali* (Düben) = brachycephali (Virchow and Lucæ)."

Baron von Düben's very interesting essay is illustrated with numerous well-executed figures. In an Appendix he quotes at some length from a paper published by Dr. Turner, of Edinburgh, in the 'Natural History Review' for January, 1864, "On Cranial Deformities, and more especially on the Scaphocephalic Skull."

The second paper in the present number is an excellent one on Croup, by H. A. Abelin, Professor of Pædiatrics in the Carolinean

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[1] Exercitationes Academicæ, Lugd. Batavor. 1785, lib. ii. cap. 1, p. 13; represented Tab. I. et II.

[2] Vol. xxii. p. 350.

[3] Zur Architectur des Menschenschädels, nebst geometrischen Originalzeichnungen von Schädeln normaler und abnormer Form. (On the Architecture of the Human Skull, with Original Geometrical Drawings of Skulls of Normal and Abnormal Form.) Frankfurt a. Main, 1857.

[4] Die Makrokephalen im Boden Osterreichs, verglichen mit der Bildungs-Abweichung welche Blumenbach Macrocephalus genannt hat. (The Macrocephali in the Austrian Empire, compared with the Anomalous Formation which Blumenbach has called Macrocephalus.) In Mémoires de l'Académie impériale des Sciences de St. Petersbourg, VII^e. Série, tome ii. No. 6.

[5] Untersuchungen ueber Wachstum und Bau des menschlichen Schädels. (Researches on the Growth and Structure of the Human Skull.) Theil i. p. 117, Plate XIII. figs. 1–4.

Institute. It runs to 88 pp., 27 of which are devoted to a history of the literature of the subject.

The third and fourth essays, concluding the number, are by Gustaf Retzius, Student in Medicine, and appear to be worthy of the distinguished name their author bears. They are highly illustrated with well-executed lithographic plates. The third is on "Some Capsular Articulations between the Arches of the Sacral Vertebræ disappearing Normally by Anchylosis." These articulations, the author observes, "which otherwise disappear about the sixteenth year, may, under certain circumstances, remain for a much longer time, sometimes yielding to the anchylosing process at a more advanced age, sometimes again remaining even for the whole of life." (p. 11.)

From the fourth paper, "A Contribution to our Knowledge of the Cervical Vertebræ," the author draws the following conclusions:

"1. The great articulations between the occipital vertebra and the atlas, and between this vertebra and the dentata (epistropheus[1]), are not oblique articulations. These latter articulations and their processes (the oblique) are wanting between the vertebræ in question in man and the other mammalia, but are met with in some birds and amphibia.

"2. The first-named capsular joints belong to a totally different, peculiar articulating system, which is situated between the central extremities of the arches. They are represented between the following cervical vertebræ by similar, more rudimentary capsular joints, those discovered by Luschka.

"3. They are supported by separate processes, which properly have their seat on the arches, but which by their fusion with the bodies appear to belong to the latter. Only the processes on the atlas are, as well as the extremities of its arches, always free from the body.

"4. These processes are not, as Luschka would have it, spreading heads of ribs, are not 'eminentiæ costariæ;' and their articulations, the articulating system just mentioned, are not synonymous with articulations of heads of ribs.

"5. It is scarcely probable that, as Meckel and Luschka consider, the bony nuclei, which sometimes occur between the bodies and the central extremities of the superior six cervical vertebræ, are rudiments of heads of ribs.

"6. The ossa costaria of the seventh cervical vertebra are a formation which, among mammalia, occurs not only in man, but is sometimes found also among others.

"7. The anterior little arch of the atlas is, as even C. Bergmann observed, in man and in the other mammalia, the only representative of an independent form of development, the here so-called hypapophysis, which in some birds occurs also on the epistropheus, and in some of the amphibia is met with likewise on the other cervical, and sometimes on the following dorsal vertebræ."

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[1] The Swedes appear to agree with Hooper in calling the second cervical vertebra "epistropheus." In Mayne's Lexicon the latter term is given as a synonyme of the atlas.—Rev.

ART. XII.—*The Successful Treatment of Internal Aneurysm, illustrated by Cases in Hospital and Private Practice.* By JOLLIFFE TUFNELL, F.R.C.S.I., M.R.I.A., ex-Regius Professor of Military Surgery in Ireland, Surgeon to the District Military Prison and to the City of Dublin Hospital, Examiner in Surgery R.C.S.Y., &c. &c.—8vo, pp. 34.

THERE are truths in medicine which are, as it were, radical; such are the general tendency of certain diseases towards spontaneous ultimate cure or destruction of life and tissue, under conditions which vary according to the nature and subject of such diseases. If the treatment of aneurysm handed down to us from Valsalva, by channels anything but direct, no longer meets the concurrence of the faculty, there survives, we may affirm, as a fruit of the multiplied observations which resulted from its over-appreciation, a general esteem or bias in favour of his method which tends towards an appropriate selection of curative means, while indirectly we owe to it a sounder estimation of the morbid condition in which the sufferer is placed by lesions of the subsidiary channels of the circulation. Bleeding, digitalis, alkalies, veratria, as agents of cure in aneurysm, are at this period at least put wholly on one side. What principle of Valsalva's treatment, then, remains? a reduction and regulation of the force of the circulation by simple methods of posture and rest, with a sparse and diminished dietary for its complement, a thorough immunity being afforded from those bodily exertions and storms of life under favour of which the blood-current dashes unsparingly and unheedingly against the shredded outlet. The late Dr. Bellingham, in association with the gentleman whose work we are reviewing, pursued this path of study and treatment for some years. Some part of what we have now before us was, if we recollect aright, laid before the Medico-Chirurgical Society of London on a recent occasion. The present brief work, however, forms a field for thought and reflection which is both rich and ample, and its merits will not fail to engage attention. The author touches but lightly on the recent cases of Mr. Moore and Dr. Murray; the former gentleman attempted the cure of aneurysm by introduction of wire-coils, while the latter succeeded in obliterating the aorta by pressure. Mr. Tufnell regards these varieties of treatment as quite exceptional, but he fixes our attention in establishing the principle that a merely diminished current is frequently quite efficient in producing the desired result of occlusion of the artery.

In the present work, Mr. Tufnell lays before us marked and striking cases, well worthy the attention of our readers, in which the patients are said to have recovered strength and activity under favour of those restrictions which his method enforces. The ages of these patients, most of whom were of a laborious and stirring mode of life, vary from thirty to fifty-four years. We confess to have perused with earnestness all the details afforded, and would willingly have extended our reading over a longer series of facts; they form evidently but a section of the author's experience, selected as appropriate for the illustration of his principle.

The Dublin professor's description of the general features of internal aneurysm is very complete and masterly, but too much expanded in length to allow of our giving it verbatim; in the attempt to contract it, we fear we may do him scant justice. As regards head symptoms, in the first place he notices cerebral torpor, pain and confusion of ideas, occasional giddiness, with a partial loss of consciousness; in the face the conjunctiva is in some cases suffused, whilst in other instances the whole countenance will be of a tallowy colour, more or less swollen, sometimes with lips that are livid. The veins of the neck may be swelled, and *one or both pupils contracted from pressure on the great sympathetic nerve.* When the aneurysm presses on the trachea at its bifurcation, the voice will be raucous; the symptom of aphonia is attributable to pressure on the recurrent laryngeal nerve; while a stridulous voice, unaccompanied by aphonia and dysphagia, serves to show that the tumour is on the right of the trachea, not implicating the œsophagus or the recurrent laryngeal. In a nicer view, we may distinguish stridor as either tracheal or laryngeal. The character of voice and form of cough or dyspnœa are also to be taken into account; the last symptom is in direct proportion to irritability of the air passages. In the chest dulness on percussion, with absence of respiration, should always arrest attention; bronchitis is a symptom which too often forms an annoying impediment to diagnosis.

Bruit de soufflet may be present in aneurysm, or wholly absent; it is no less liable to occur from dilated aorta; nay, if a circle of bone surround the aortic orifice, this character of sound may really resemble that note of a trumpet. The form and size of an opening into an aneurysm modifies the bruit, so likewise does the size of the aneurysmal cavity: loud and rough when the orifice is small and irregular; the bruit is most frequently soft and little distinct when a large smooth opening enters a sac of unusual size. *Bruit de soufflet* is equally a symptom of valvular disease in the heart, and an aneurysm confined to this viscus is liable to be mistaken for valvular disease. It will be seen, then, that *bruit de soufflet* is not in itself a symptom of especial value until it is taken in the aggregate with other signs of morbid change in the thoracic cavity, such as undue pulsation, dyspnœa at intervals, oppression at the præcordia, and dysphagia. The symptom on which our author lays the greatest stress is pulsation, in reference to which it is necessary for diagnosis to bear in mind the rapidity which cancer displays in its growths as surpassing the ordinary rate of progress of aneurysm; we must be alive to the possible eventuality of separate aneurysms co-existing with anterior and posterior pulsation, as well as to that of the heart being projected forwards in cases of aneurysms existing about the thoracic and abdominal portions of the aorta. In abdominal disease, in general, we should not neglect to pay attention to the degree of lateral dilatation in the tumour as an assistance to diagnosis. One circumstance is particularly urged upon our notice, which is that all the stethoscopic symptoms that accompany aneurysm of the aorta, such as *bruit de soufflet,* stridor, and also dysphagia, do sometimes intermit, and for awhile entirely subside; the cause is probably to be found in a temporary diminution of the diastolic condition of the blood-sac from reduction of the heart's action. Obesity, until diminished by medicines and regimen, largely obstructs diagnosis. This we have lately had occasion to verify in a case of mistaken aneurysm of the neck, which had been a source of anxiety for many years. Dr. Henry Kennedy has already directed attention to the influence which respiration has upon pulsating tumours of the abdomen, in obscure or difficult cases. Should the mesenteric artery, however (says our author), happen to be the seat of the disease, then respiratory motion might certainly affect the tumour, but in no other form of aneurysm would such be the result; and aneurysm of the mesenteric vessels is very, very rare. The valuable observation insisted on by Dr. Allan is referred to—viz., that pulsation in aneurysm increases in strength by degrees, whilst other abdominal tumours begin suddenly, are most violent in the early stage, and abate in time. Bruit is more frequent in abdominal aneurysms, and most so when the patient is recumbent. In this variety, experience shows that, from sympathetic irritation, the stools are not seldom involuntarily discharged. We have to note that the extent of the abdominal tumour is not always commensurate with the disease, but depends upon the nature of each special case.

As regards pain, it is a very constant and valuable, as well as variable symptom; and our author goes so far as to say that we ought to examine carefully in the back and loins in every case of aching pain, lumbago, or fulness; for should bruit be heard, it will at once decide the opinion. It is well known that but a small tumour, springing from the back part of the aorta, will cause agony and occasion absorption of the bodies of the vertebræ. In cases of this character, in addition to boring and burning pain, there is often experienced the darting pain of sciatica, or perchance numbness and loss of motive power from nerve pressure; if the post-peritoneal tissues and psoas get infiltrated with blood, there ensues pain in the groin and along the spine; but pain is not the necessary accompaniment of erosion of the vertebræ.

A difference in the pulses at the wrist may ensue from plugging of a vessel by fibrine or pressure of the subclavian at its origin; indeed, a clot may extend for several inches from the sac into the vessel, when this last is entire as it leaves the sac. Want of pulse of the right radial leads to the fair inference that the arteria innominata is the seat of disease. But sometimes when the ascending portion of the aorta is affected near its origin, both radial arteries have good pulsation.

In the lower extremities when there is abdominal aneurysm there will often be absence of pulsation in the femoral and its branches, with sciatic pain. Numbness of fingers and toes when exposed to cold are indicative of the affection; indeed, from animal heat being interfered with, there is often a general coldness of the whole body.

We have been induced to give, in a somewhat abbreviated form, our author's general description of this class of affections, as we believe it to constitute the sum of lengthened personal experience. We have now only space sufficient to touch upon the rationale of the main features in treatment. Recumbence places that check, he says, upon the circulation in aneurysm of the internal parts, which in external cases is attempted by mechanical means—and how does it operate?

We draw the following scale in illustration from the data of one of Mr. Tufnell's cases:

The pulse, when standing and in ordinary exercise, is	96	per minute
The pulse after lying horizontally for a while . . .	66	
Difference of pulse caused by position	30	beats per minute
Multiplying 30 beats by 60 minutes	60	
	30	
Gives	1800	beats per hour
And multiplying 1800 beats by 24	24	
	7200	
	3600	
Gives no less than	43,200	beats per diem

What remedial agent in the Pharmacopœia could produce this result? There is none. We refer to the pages of our author for further details of treatment. It is true that in the most advanced light of science, the method cannot claim altogether the merit of novelty; that it has been to any extent successful gives it a claim to attention; that it has failed in particular instances is within our knowledge certain; it is too important in itself not to receive a long trial. The name of Bellingham, too, will invest it with many claims to attention, and the unpretending form in which a well-reasoned production has come before us, has specially pleaded for a lengthened observation of its contents.

Art. XIII.—*Lectures on the Diseases of the Stomach, with an Introduction to its Anatomy and Physiology.* By William Brinton, M.D., F.R.S. Second Edition.—*London*, 1864. 8vo, pp. 368.

The first edition of this work became, immediately after its publication, a standard authority on the diseases, functional and organic, of the primal organ of the human machine. We ascribe this dignity to the stomach, because it would be easy to show that as the simplest form of animal life consists of a stomach and nothing else, so the other organs which arrive at their greatest development and complexity in the higher vertebrates, become grouped in the ascending series by degrees around the digestive sac, and acquire their higher phases of structure and functional activity in proportion as their powers are taxed by its requirements. Since the time of the appearance of Dr. Brinton's work it has maintained its position, at least in this country, without a rival. The present edition is a revised and somewhat enlarged re-issue of the former, with, however, the addition of two chapters—one on Gastric Phthisis, and one on Gout in the Stomach. It is unnecessary here to repeat the praise which we formerly bestowed on the book when it was a *débutant* soliciting professional favour. We welcome it now as a well-known and tried friend, grown somewhat more portly since we met, but still essentially the same. The added chapters, however, are entirely new, and as they express the views on two most interesting and little understood subjects, of one of the most careful and most diligent clinical observers of the day, we need no apology for devoting a short space to their examination.

Very vague are the ideas we most of us associate with the term "gastric phthisis." Where are the cases of phthisis which are not in some sense gastric? Take any one of the stages into which the disease is commonly divided, and in each the symptoms are only less those of stomach disorder than of pulmonary. The initiatory stage of ordinary chronic consumption is so often preceded by dyspepsia, that to ascribe its development to the effect of imperfect digestion and consequent mal-nutrition, is the conclusion of observant common-sense. In other cases the same relation cannot be traced, the dyspepsia and the tubercular deposition make their appearance simultaneously; apparently, the twin offspring of the same cachectic condition of the organism. In others again, and, perhaps, in the larger number, the evidence of tubercle in the lung may be clear and definite before the stomach gives any sign, at least before the dyspeptic symptoms acquire sufficient gravity to divide with the pulmonary the patient's attention. In such a combination Dr. Brinton ascribes the dyspepsia with the accompanying cachexia, to the effect of dead, dying, or decomposing tuberculous matter on the system at large, the influence of which is heightened as the disease advances by undue bodily waste, sweating, and suppuration. Then, again, there are two specific causes of dyspepsia inseparable from phthisis: the first, the imperfect aëration of the blood arising from diminished respiratory surface, and the consequent sub-oxidation of the whole system; the second, the nervous irritation and exhaustion which have their origin in the constantly increasing expenditure of nervous energy necessary to compensate for the progressive damage of organs, whose functions whilst life continues must know no intermission. To this exhaustion of nervous energy must be attributed the vomiting which accompanies, or rather terminates, the fit of coughing in advanced phthisis. The enfeeblement of the nervous system permits a kind of morbid co-ordination between its various parts, which lose, as it were, their independence, and become liable to be drawn into common action. Such is a brief summary of the various links which connect the gastric with the pulmonary elements of the disease as ordinarily observed. Each group of phenomena might claim the appellation gastric phthisis as a secondary title, but to none of them is it awarded by Dr. Brinton. For it he reserves another phase of morbid action, in which the stomach plays more conspicuously the principal part, and the pulmonary element appears to the ordinary observer rather as a late addition than an integral part of the original affection.

"The outline of a typical case of this kind may be drawn somewhat as follows: The patient, usually under thirty-five years of age, feels the first approach of the malady as an 'indigestion'—an epithet which, on inquiry, resolves itself into a pain beginning between the first and second hours after food, and going off gradually. At first, such a pain often follows but one of the daily meals, perhaps oftenest a full morning repast. It rarely brings with it any flatulence, and is still more rarely relieved by eructation. As the malady advances, the pain becomes more frequent, and follows all the meals; only distinguishing, by attacks of unusual severity, those in which the food is more copious in quantity, or more solid and indigestible in quality. By-and-by the sickening depression, which has gradually been recognised as an element of the increasing pain, diverges into distinct nausea; and this, again, soon provokes retching, which in its turn sometimes gradually deepens into vomiting. Often, however, the latter symptom remains long and permanently absent. If present, it is only rarely, or after long persistence, that it brings back from the stomach any of its alimentary contents; and even then scarcely ever unloads the organ, much less relieves the pain by which it is preceded. By longer continuance the pain and retching become more severe, and more easily provoked, and therefore continually approach the period of taking food, so as not only to follow it by a shorter interval, but at length to limit the meal to little more than painful and unavailing attempts to take food, the suffering which immediately follows its deglutition becoming almost unbearable. The climax of gastric disturbance thus attained is, in rare instances, itself the chief cause and immediate forerunner of death. But it much more commonly either inaugurates a rapid infiltration of the lungs with tuberculous deposit, or is displaced by the thoracic symptoms of tubercle already deposited, to alternate (it may be) with such symptoms during the brief remainder of life. In other cases the dyspepsia amends spontaneously, or is vanquished by appropriate treatment; and the patient, slowly recovering flesh and strength, advances toward that imperfect health which, in so many instances, is associated with the retardation or arrest of the progress of tuberculosis; perhaps until the infirmities of declining years, mingled with the insidious symptoms of the malady, leave us in doubt as to which of these two causes—natural decay or tubercular disease—we must chiefly refer the eventual death." (pp. 342, 343.)

We have thus allowed Dr. Brinton to state, in his own words, the class of cases to which he thinks the appellation "gastric phthisis," *par excellence*, belongs. We do not stop to inquire whether this is the only form of dyspepsia to which the name might be rightly applied. As a definition of species is the standing difficulty of the naturalist, so if the nosologist attempt to trace his definitions with anything approaching rigid, unbending exclusiveness, he is stopped at the very threshold by so many exceptions—so numerous are the aberrant examples, and so protean the forms which the same case may assume in its progress—that he is tempted to discard classification as an artifice by which science can only gain at the expense of her claims to be the faithful interpreter of nature. No one, we think, will dispute the occurrence of such cases as Dr. Brinton describes, and we owe him thanks for having singled them out from the mass and made them the subject of clinical study. His first inquiry is, do these cases of gastric phthisis follow the same law of transmission from relatives as do those of ordinary pulmonary consumption? He finds that the law of hereditary transmission holds good, qualified, however, by exceptions. First, the percentage is smaller, family taint is more frequently absent than in common pulmonary tuberculosis; and secondly, when it is present, "there is a manifest tendency to the affection of various members of the same family, with a similar or analogous form of phthisis;" one or even two members will be found to have been the subjects of gastric phthisis, whilst another will have succumbed to the intestinal form of tuberculosis. Diagnosis, therefore, is more rarely helped by family history; neither does auscultation greatly aid it, unless, as Dr. Brinton suggests, the absence of thoracic signs is to be considered as valuable an indication as their presence in the more ordinary forms of pulmonary disease. Rarely or never has he encountered the *nexus* of symptoms he describes associated with the physical signs of aggregated tubercles, much less with those of softening and removal. Nay, more, he states that that form of disseminated miliary tubercle which, by spontaneous ripening, constitutes what is known as acute phthisis, rarely approaches in its gastric manifestations the typical case he has drawn. One important point in the diagnosis of these cases is, however, the amount of febrile reaction which accompanies the dyspepsia and distinguishes it from that of ulcer of the stomach, or any more common and evanescent derangement of that organ. The whole condition of the patient testifies to an intense, deep-seated, though latent irritation, for which even the strongly-marked gastric disturbance scarcely accounts. Another diagnostic mark to distinguish these cases from ulcer or cancer is the absence of hæmorrhage. Beyond a mere trace of bloody mucus produced by the efforts of vomiting, hæmatemesis has never been observed by Dr. Brinton—a fact which, as he observes, indicates the existence of a bloodless rather than a congested state of the gastric lining membrane. The pain varies in intensity and also in seat, radiating in various directions from the epigastrium; in its relation to food as its cause, it is more capricious and uncertain than the pain of structural gastric disease: hence in these cases the instincts of the patient as to diet may be consulted with greater advantage than in the dyspepsia of ulceration. In the advanced stages of the malady the attack of vomiting may follow so closely the ingestion of food that it anticipates, as it were, the paroxysm of pain. Chemical examination of the vomited matters, as well as the clinical study of the case, prove that the secretion of the gastric juice is diminished and its quality deteriorated; in fact, in the more advanced and intense stage of the malady, the secretory act seems reduced to a minimum.

The group of symptoms which Dr. Brinton thus describes, he considers as indicating a kind of neuralgia of the pneumogastric and sympathetic nerves; he believes that certain thoracic segments of these nerves form the starting-point of an irritation or morbid action which is transferred to their abdominal connexions, and is manifested in the visceral branches of the solar plexus. Just as an amount of tubercular deposit, insufficient to be detected by physical examination, may give rise to hæmoptysis, so it may set up an irritation in the delicate nerve-tubes of the pulmonary tissue, which, transmitted to their gastric connexions, results in the increased sensibility, the muscular spasm, and the diminished secretion, which we have seen are leading features in "gastric phthisis."

Dr. Brinton's experience has led him to form a very favourable estimate of the power of treatment in these cases. Of course he means systematic general management, and not mere dosing with drugs. Often, he says, has he seen a patient who had been unable to take a teaspoonful of milk without vomiting, and who has been extenuated with pain, improve so rapidly as in two or three weeks to be consuming daily a generous diet, consisting of all the ordinary ingredients of a day's food and drink amongst the middle classes, with, in addition, two or three ounces of cod-liver oil. The rôle of medicines, Dr. Brinton indicates, is not an extended one. Opium and the stronger sedatives are often ill-borne, and still oftener unnecessary. The carbonated alkalies, bismuth, prussic acid, or the sulpho-cyanide of potassium, and, after careful preliminary treatment, the various preparations of iron, are the chief remedies he advises. Of the salts of iron, the effervescent citrate is particularly serviceable; either it, or the sulphate in the form of pill, may be advantageously combined with minute doses of the iodide of potassium. The diet should consist, at first, of the small doses of milk, meat, broths, and farinaceous food, which are found best to meet the requirements of grave structural dyspepsia. Whilst little or no solid food can be taken, insalivation should be stimulated by the homely artifice of sucking a small pebble, or chewing a piece of caoutchouc: thus the acidity and flatulence arising from the ingestion of unmasticated, starchy food will be avoided. But much sooner than in gastric ulcer may a more liberal diet be allowed, the rapid improvement observed consonating with Dr. Brinton's view of the neuralgic nature of the gastric affection; whilst, on the other hand, occasional relapses, without any obvious cause, warn the physician of the latent pulmonary lesion, which is the first link in the chain of morbid sequences.

The author's last chapter, on "Gout in the Stomach," is like the celebrated performance of Hamlet, remarkable for the absence of the principal character. Is there such a pathological entity as gout in the stomach? Dr. Garrod, who is a great authority on gout, doubts it; and Dr. Brinton, who is an equally great authority on the stomach, has never seen it. The latter proceeds to eliminate, first, the cases of sharp and sudden dyspepsia occurring in gouty persons from the ingestion of food improper in quantity or quality—cases quaintly called by Dr. Watson *pork* in the stomach; secondly, attacks of biliary colic, which frequently occur at the age and in the constitution most amenable to gout; nay, sometimes alternate with articular gout in such a manner as to suggest the idea of metastasis. Thirdly, cases of renal degeneration of gouty kidney, in which a sudden check of renal secretion gives rise to gastric symptoms—pain, vomiting, prostration—identical with those ascribed to gout in the stomach. We may here, in passing, ask a question, the validity of which is indeed acknowledged by the author—whether these cases have not, practically at least, a good claim to the appellation? The kidney disease is a gouty malady; the symptoms occur in the course of a gouty paroxysm, and are determined at least by the presence of gout in another organ. Dr. Brinton, however, thinks that the symptoms are not identical with those of the traditional "gout in the stomach." They are those rather of acute uræmic poisoning, with a "gastric determination of urea;" although, if urea be determined to the stomach, we are at a loss to know why uric acid should not be determined there also. He thinks the pain is rarely intense and *local*, whilst the vomiting and purging are unduly prominent, and prostration of the general system and circulation is rather a gradual result of the symptoms than synchronous with their attack. A chemical and microscopical examination of the urine will of course clear up any doubt. Fourthly, there are the pain and vomiting, prostration and dyspnœa, which occur towards the close of cases of valvular disease of the heart, degeneration of its structure, disease of the coronary arteries, and dilatation and atheromatous formations in the aorta—the latter lesions especially associated with inveterate gout. When these four groups of cases are subtracted, the author asks, "Is there any 'gout in the stomach' left?" If so, he has never seen a case, and has never been able to obtain trustworthy evidence of one. Yet he does not absolutely deny their existence:

> "Just as, in acute gout and acute rheumatism, I have constantly found the stomach in such a state of tympanitic relaxation as suggests great irritation of the nerves of the organ, so I should surmise that it is quite possible there may be a more intense and exceptional form of this nervous irritation, productive of violent pain, vomiting, and cardiac disturbance, perhaps capable of giving rise to at least an hæmorrhagic effusion from the coats of the organ. That the dyspepsias of the gouty subject show a far-off approach to phenomena of this kind has already been stated; and I may add, they are in this respect paralleled by the dyspepsias of convalescents from rheumatic fever, as well as from ordinary fever. Both such cases as causes of death must be infinitely rare." (p. 361.)

Still, as the author acknowledges, the condition he pictures would be entitled to no higher nosological rank than that of an "anomalous disorder of the nervous system." It is by no means what earlier writers have meant by the term "gout in the stomach." Whether their published experience, supported as it is by what we know of the nature of gout, by the fact that the disease depends on the retention of a particular poison in the circulating fluid, and by the undoubted eliminative function performed by the stomach in the presence both of organic and inorganic poisons—may prove to be a faithful record of nature, is a question on which Dr. Brinton and ourselves would probably not entirely agree. Meanwhile, further careful observations can only confirm or disprove his conclusions.

PART THIRD.

Original Communications.

Art. I.

On the Urine of the Insane: a Contribution to Urology. By Adam Addison, L.R.C.P. and S. Ed., Resident Medical Officer, Montrose Royal Asylum.

Most of our knowledge of the chemistry of the urine in insanity appears to be derived from a paper on this subject published by Dr. Sutherland in the 'Medico-Chirurgical Transactions of 1855.' The conclusions arrived at by the author of that essay were the following:

1. A plus quantity of phosphates exist in the urine in the paroxysms of acute mania.

2. A minus quantity exists in the stage of exhaustion of mania, in acute dementia, and in the third stage of general paralysis of the insane.

3. The plus and minus quantities of the phosphates in the urine correspond with the quantitative analysis of the brain and of the blood, for a plus quantity of phosphorus is found in the brain, and a slight excess of albumen in the blood of maniacal patients, and minus quantities of phosphorus and albumen are found in the brain of idiots, and a minus quantity of albumen in the blood of paralysis of the insane.

4. The plus quantity of phosphates in the urine of acute mania denotes the expenditure of nervous force, and is not a proof of the existence of acute inflammation in this disease.

Unfortunately, the method of investigation adopted by Dr. Sutherland was not such as to give reliable results. It was the old and now obsolete one of determining only the per-centage amounts of the urinary constituents without reference to the quantity of urine passed in a given time. No doubt it is true that, as Dr. Sutherland expresses it, there is a plus quantity of phosphates in one thousand grains of the urine of a maniacal patient as compared with the amount found in the same measure of urine passed in the normal state; but then the patient in acute mania may be voiding from ten to twenty ounces only in the twenty-four hours, whilst in health he excretes from fifty to eighty; consequently it may happen that, after recovery, with a greatly diminished per centage of phosphates, he actually excretes a larger quantity than during the maniacal paroxysm. I think, therefore, that the whole subject stands in need of revision.

The mode I have adopted has been to collect the whole urine passed in twenty-four hours for three or more successive days, and to ascertain by analysis the absolute amounts of certain of its constituents excreted during that time. Dr. Sutherland refers to the impossibility of collecting all the urine during mania; but it is my experience that there are many cases where this can be done.

By careful attention on the part of the night attendant, and by placing a special nurse with the patient during day, I have perfectly succeeded in obtaining all that has been passed; and I can confidently declare that the quantities I have given are correct. In acute cases which have recovered, I have always compared the urine of the abnormal state with that of the normal, because the individual healthy standard must always be more correct than the average of a number of cases. In dementia and melancholia, where such a comparison has been impossible, I have adopted two methods. Firstly, I have compared the quantities voided under such conditions with those passed by healthy men and women, irrespective of age and weight; and, secondly, I have found the amounts excreted by 1 lb. avoirdupois of body weight in twenty-four hours, and contrasted them with the normal standard ascertained in the same way.

In order to facilitate this comparison, I will give in the following table, made up from Dr. Parkes's book, 'On the Urine,' the amounts of those constituents which I have made the subject of examination; first, as they are excreted in health (age and weight indifferent); and, second, according to a definite weight of body:

	Males.				Females.			
Constituent.	Minimum.	Mean.	Maximum.	1 lb. excretes in 24 hours in grs.	Minimum.	Mean.	Maximum.	1 lb. excretes in 24 hours in grs.
Chloride of sodium	...	177·0	...	...	...	...	...	...
Urea	286·1	512·4	688·4	3·53	...	390·0	...	2·96
Phosphoric acid	24·70	48·80	79·80	0·336	...	56·2	...	0·464
Sulphuric acid	17·34	31·11	41·14	0·214	...	30·2	...	0·25

Dr. Parkes points out that in the women the phosphoric acid is probably set down as too great in consequence of the small number of cases taken for the average. In seven women, after recovery, I found the minimum of phosphoric acid to be 22 grs., the mean 35·66 grs., and the maximum 61·90 grs. The range above and below the mean of the chloride of sodium is very great, from 30 to 60 per cent. Parkes observes that "the limits of variation above and below the mean excretion, according to weight, are certainly considerable. If we compare two persons we find that one may excrete in twenty-four hours only 0·390 grammes (Beneke in one series), and another 0·529 grammes of urea to each kilogramme; and variations as great occur in the other ingredients. Also, in the same person the amount of urea excreted by each pound weight of the body at different times varies rather largely (even occasionally as much as 20 per cent.), so that certainly we must allow a wide range of mean, maximum, and minimum excretion above and below the mean recorded in the table. In the other ingredients the maximum and minimum excretion of each pound weight is even greater than in the case of the urea."

The mode of chemical analysis adopted was the volumetric. The chloride of sodium and the urea were found by Liebig's method with solution of pernitrate of mercury, the phosphoric acid by a graduated solution of uranium, and the sulphuric acid by ascertaining the neutral point after precipitation with baryta. The results are expressed in English ounces and grains, as being more easy of comparison than the French measures.

Cases of Mania.—The urine was collected in the following cases as they were admitted, and generally when the maniacal paroxysm had become fully developed. A special attendant was placed with the patients, otherwise they were subjected to no restraint, and were allowed the freedom of the ward. The cases are mostly women, because I found that the female attendants were more careful than the male in attending to the proper collection of the urine. In young cases, and at the commencement of a maniacal attack, it is generally not difficult to obtain the whole urine passed; and it is only after the system has lost its tone that dirty habits set in. None of the cases required to be artificially fed. As regards diet, it was good, and in sufficient quantity, and was the same for all. It is not, however, an easy matter to determine with certainty the connexion between the dietary and the urine in insanity, for it is seldom that the full quantity is taken by maniacal patients:

I. Ann F., aged twenty-two. Feb. 5–8, 1864.—Is maniacal, sleepless, and violent in her conduct; shouts, gesticulates, and talks incoherently; bodily condition fair; pulse 100, small; takes food moderately well.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	14·0 oz.	1030	28·58	216·41	22·94	13·62
2	20·5	1026	50·82	251·12	24·75	13·19
3	17·5	1026	40·83	193·95	18·09	12·57
Total	52·0	1027	119·23	661·48	65·78	39·38

March 25–20, 1864.—Has quite recovered; works regularly; health fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	55·25 oz.	1016	54·78	483·43	26·72	29·77
2	43·50	1017	41·86	475·78	25·69	23·44
3	55·50	1017	61·51	663·68	27·77	33·23
Total	154·25	1016	188·15	1622·79	80·18	86·44

In this case the urine was collected during a fully developed relapse of acute mania. It will be seen that the urinary constituents excreted after recovery are greater than those voided during the maniacal paroxysm. In the totals the average specific gravity is given, and the same will be continued throughout these cases.

II. Christiana M., aged thirty-four. March 15–18, 1864.—Is maniacal, restless, sleepless, and destructive to her clothing; talks incoherently; pulse 90; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	14·0 oz.	1026	28·58	245·00	19·11	5·03
2	21·5	1022	54·55	344·89	16·85	7·40
3	19·5	1015	20·97	204·08	10·73	5·83
Total	55·0	1021	104·10	793·97	46·69	18·53

April 5–8, 1864.—Recovered; no change as to bodily health.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	74·0 oz.	1015	53·55	453·25	35·79	28·80
2	64·5	1013	56·43	357·43	24·82	14·48
3	59·5	1015	78·09	503·27	35·72	21·38
Total	198·0	1014	188·07	1313·95	96·33	64·66

This was a case of puerperal mania. Its most remarkable feature is the small amount of sulphuric acid excreted in the maniacal state; otherwise it agrees with the first case.

III. Agnes S., aged forty-five. Feb. 23–26, 1864.—Very excited; dancing, singing, and talking incoherently; bodily condition rather emaciated; pulse 96.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	21·0 oz.	1030	61·25	312·37	26·61	19·33
2	14·5	1031	16·91	215·68	16·91	8·79
3	36·5	1022	29·62	412·58	24·68	21·17
Total	72·0	1027	107·78	940·63	68·20	49·29

May 2–5, 1864.—Quite recovered; bodily condition much improved; works regularly.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	40·5 oz.	1020	43·62	395·71	35·12	21·82
2	28·0	1020	40·41	277·66	23·30	14·66
3	49·5	1015	56·09	389·81	30·55	16·30
Total	118·0	1018	140·12	1063·18	88·97	52·78

Urine was collected under the same conditions as in the foregoing cases, and with the same result.

IV. Jane C., aged seventeen. March 26–29, 1864.—She is maniacal, violent, and unmanageable; talks incoherently; bodily condition fair; pulse 108.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_3.	SO_3.
1	18·5 oz.	1029	29·69	377·70	20·41	23·26
2	9·5	1031	27·70	192·98	9·21	11·23
3	18·5	1030	21·58	294·06	17·56	15·51
4	13·0	1030	15·16	193·37	16·26	7·39
Total	59·5	1030	94·11	1058·11	63·44	57·39

Sept. 10–13, 1864.—Recovered; has grown very stout.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_3.	SO_3.
1	44·0 oz.	1017	38·50	385·00	28·60	14·48
2	72·5	1011	63·43	507·50	31·41	25·04
3	26·0	1017	30·33	182·00	15·60	11·67
4	86·0	1016	75·25	677·25	43·00	28·31
Total	228·5	1015	207·51	1751·75	118·61	79·50

In this case the difference is still more striking, apparently owing to the increased weight and improved condition of body.

V. Isabella M., aged twenty. March 26–29, 1864.—Conversation is incoherent; she is very confused, restless, sleepless, and untidy; pulse 90; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_3.	SO_3.
1	6·5 oz.	1032	15·32	120·69	8·10	7·30
2	9·5	1032	27·70	182·66	12·53	9 95
3	13·0	1032	37·91	246·45	15·60	10·24
Total	29·0	1032	80·93	549·80	36·23	27·49

Oct. 1–4, 1864.—Bodily condition improved; conversation correct; behaves quietly, but almost daily has hysterical fits of laughing and crying.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_3.	SO_3.
1	30·5 oz.	1023	33·36	320‘18	21·07	15·97
2	41·0	1021	47·83	465·85	23·71	19·02
3	68·5	1015	59·93	499·47	24·21	13·32
Total	140·0	1019	141·12	1285·50	68·99	48·31

Though this case can scarcely be said to have recovered, it shows that the amounts of the urinary constituents passed are less during mania than after quiescence.

VI. Janet D., aged fifty-seven. Feb. 5–7, 1864.—Noisy; shouting and talking incoherently; pulse 97; bodily condition emaciated.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	22·5 oz.	1019	16·39	183·75	15·75	12·67
2	24·0	1013	9·10	188·33	11·18	6·40
Total	46·5	1016	25·49	372·08	26·93	19·07

Aug. 29–Sept. 1, 1864.—Recovered. Bodily condition improved, but she is still thin.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	62 oz.	1016	36·16	379·75	28·93	15·77
2	71	1015	31·06	414·16	26·03	26·56
Total	133	1015	67·22	793·91	54·96	42·33

The days here are too few, but the case points to the same result as in the others.

VII. Margaret B., aged fifteen. Feb. 8–11, 1864.—Maniacal, sleepless, noisy, and violent; bodily condition good; pulse strong, 98.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	6·0 oz.	1035	19·25	110·25	13·00	7·54
2	25·5	1030	74·37	375·59	39·16	27·48
3	20·5	1030	59·79	370·70	26·33	9·72
Total	52·0	1031	153·41	856·54	78·49	44·74

Patient recovered, and had a relapse.

March 15–23, 1864.—Very violent, noisy, and destructive.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	61·5 oz.	1020	89·68	574·00	62·57	47·88
2	19·5	1032	51·18	355·46	35·77	33·57
3	8·5	1032	8·03	192·90	20·83	12·44
4	17·0	1030	19·83	304·93	27·79	27·99
5 6	25·5	1030	29·75	531·78	38·27	32·45
7	15·5	1030	18·08	235·08	28·43	13·69
8	11·0	1021	9·62	137·95	13·57	5·59
Total	158·5	1027	226·17	2331·10	227·23	173·61

Aug. 10–18, 1864.—Recovered; grown very stout; works regularly.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	68·0 oz.	1022	69·41	714·00	51·00	23·58
2	44·5	1020	45·43	427·57	34·11	16·62
3	73·0	1019	63·87	851·66	65·55	28·27
4	48·0	1014	35·00	434·00	30·40	16·47
5	73·5	1019	53·59	664·56	46·54	30·80
6	69·5	1018	70·94	587·85	54·48	29·75
7	66·5	1018	58·19	533·38	47·67	34·84
8	74·0	1017	53·95	602·46	43·19	36·56
Total	517·0	1018	450·38	4815·48	372·94	216·89

In all the foregoing cases the urine was collected after the mania had become fully developed, but in this case I had an opportunity of watching the relapse from its commencement; and I believe it affords a very fair illustration of the changes which take place in the urine at the beginning of a maniacal attack, and onwards throughout its course. It will be noticed that during the first twenty-four hours the quantity of the urine was not diminished, and the amounts of the constituents under investigation were larger than the daily average after recovery; but on the second day the quantity of the urine and its constituents fell greatly, in an inverse ratio to the development and intensity of the mania; and this relation was continued throughout the course of the attack. As regards the phosphoric acid, it will be seen that, though the amount passed on the first day is large, still it is not equal to the quantity excreted on the third day in the normal state; and that even with its addition the absolute amount excreted during the mania is still very far below the excretion in health.

VIII. Margaret P., aged twenty-four. Aug. 27–30, 1864.—She is very violent and incoherent in her talk, sleepless, and noisy; bodily condition fair; pulse 86.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	12 oz.	1028	14·00	262·50	17·23	13·65
2	20	1026	20·41	425·83	21·46	27·53
3	15	1025	15·31	299·37	19·25	8·30
Total	47	1026	49·72	987·70	57·94	49·48

Oct. 12–15, 1864.—Excitement is passing away; she is quiet, and works a little, but her manner is excitable and forward; bodily condition not so good as on admission.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	75·0 oz.	1014	54·86	415·62	22·89	17·96
2	45·5	1015	33·17	265·41	17·13	13·61
3	48·5	1015	49·51	268·77	20·62	12·34
Total	169·0	1014	137·54	949·80	60·64	43·91

The second examination in this case was made just as the patient began to convalesce, and at a time when the system had been considerably deteriorated by the previous excitement. It will be seen that the urea and sulphuric acid are less after quiescence than during the paroxysm, but that the chloride of sodium and phosphoric acid are higher. This case presents a comparison of the amounts excreted during mania and during the depression immediately following, and it will be seen that the quantity of phosphoric acid is greater in the latter condition. I cannot doubt that, after the system has recovered its tone, the excretion of all the elements will be much increased.

IX. Elizabeth A., aged forty. June 15–18, 1864.—She is maniacal, sleepless, violent, and incoherent in her talk; bodily condition fair; pulse 93.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	23·5 oz.	1032	34·27	562·41	41·15	32·36
2	14·0	1034	20·41	306·25	25·45	22·00
3	14·5	1032	21·14	351·02	23·70	23·88
Average	17·3	1032	25·27	406·56	30·10	26·08

This case has not recovered; but a comparison of the results with the average healthy excretion in women will show that the quantity of urea is higher, the sulphuric acid about normal, and the chloride of sodium and phosphoric acid below the mean.

As all the foregoing cases were marked by symptoms of great violence and intensity, I shall now give some instances of a milder form.

X. George E., aged forty-three. Feb. 20–23, 1864.—Talks incoherently; is fidgety, restless, and sleepless; bodily condition fair; pulse 91.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	39 oz.	1027	52·32	534·62	29·35	31·81
2	60	1018	61·24	833·33	40·00	33·81
3	51	1024	74·37	639·62	39·95	36·29
Total	150	1023	187·93	2007·57	109·30	101·91

Sept. 13–16, 1864.—Is quiet and well behaved; conversation correct; works regularly; bodily condition improved.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	62·0 oz.	1023	90·41	741·41	49·16	38·97
2	73·0	1018	127·75	702·62	46·23	33·71
3	51·5	1019	92·23	469·58	30·90	23·78
Total	186·5	1026	310·39	1913·61	126·29	96·46

In this case the amounts of urea and sulphuric acid excreted during the mental excitement are greater than after quiescence, while those of the chloride of sodium and the phosphoric acid are larger in the latter condition.

XI. William R., aged thirty-two. June 22–25, 1863.—Is restless and sleepless; makes ridiculous gestures with his features and hands, and caresses fellow-patients; does not speak; bodily condition fair; pulse 96.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	28·5 oz.	1027	20·78	336·62	36·57	19·86
2	32·0	1026	35·44	335·76	33·60	17·07
3	48·0	1024	41·66	575·00	36·00	27·75
4	34·0	1021	29·75	257·83	36·50	17·64
Total	140·5	1024	127·63	1505·21	142·67	82·32

Aug. 25–30, 1864.—Has a lucid interval at present; bodily condition is not improved; does not work.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	58·5 oz.	1020	76·78	494·81	33·15	23·63
2	38·0	1028	49·87	550·83	41·16	34·12
3	44·5	1021	45·43	480·23	27·48	21·31
4	24·5	1030	50·02	350·14	26·13	19·06
Total	165·5	1024	222·10	1876·01	127·92	98·12

In this case the amounts of the urinary constituents excreted during the lucid interval are greater than those passed during mania, with the exception of the phosphoric acid. The cause of this diminution of the phosphoric acid may have been accidental; but, at the same time, it ought to be recollected that a considerable time intervened between the examinations, that the patient had had several maniacal attacks in the interval, that his system had lost tone, and that he was not working.

XII. Ann R., aged sixteen. Sept. 6–9, 1864.—Looks drowsy, complains of pain in head; behaves quietly; laughs and mutters incoherently to herself; pulse 80; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	36·0 oz.	1019	42·00	252·00	14·54	14·54
2	28·5	1020	41·56	224·43	16·20	16·20
3	66·0	1020	96·25	442·75	31·61	31·61
Total	130·5	1019	179·81	919·18	62·35	60·35

Oct. 10–13, 1864.—Sleeps well, works regularly; habits active; has given over muttering and laughing to herself.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	89·25 oz.	1016	78·09	637·76	41·58	40·50
2	73·50	1015	53·59	428·75	22·43	22·00
3	61·00	1015	53·37	382·52	21·56	17·34
Total	223·75	1015	185·05	1449·03	85·57	79·84

This was a very mild case, and it is possible that the symptoms had been subsiding when she was admitted. The excreta are all increased during the convalescent stage.

XIII. Margaret P., aged sixteen. Sept. 5–8, 1864.—Is excited and restless; laughs and giggles when spoken to, and speaks in an excited manner; noisy at night; pulse 73; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	46·0 oz.	1014	46·95	320·18	23·00	11·69
2	22·5	1021	59·06	465·85	15·37	10·10
3	34·0	1017	29·75	499·47	30·80	18·44
Total	102·5	1017	135·76	285·50	69·17	40·23

Oct. 10–13, 1864.—Excitement has disappeared; she is quiet, sleeps well, and works in the sewing-room.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	42·5 oz.	1014	30·89	272·70	16·38	16·53
2	65·0	1011	28·43	341·25	19·84	15·56
3	85·0	1015	49·80	623·43	39·01	28·15
Total	192·5	1013	109·12	1537·38	75·23	60·24

This, like the previous, was a very mild case, and possibly some of the most severe symptoms may have disappeared before it came under my observation. It is a fair inference from these cases that in certain mild forms of mania, when the quantity of urine is not so greatly lessened as in the severer types, the amount of phosphates excreted is not greater than in the normal state.

The following cases show that in epileptic mania the urine is affected by the same law.

XIV. John M., aged fifty.—An epileptic; fits occur every month, several in succession, for one or two days, and he becomes very morose, vicious, and dangerous.

PAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	14·5 oz.	1033	21·14	325·64	14·44	28·61
2	17·0	1031	44·62	374·35	18·16	24·68
3	16·5	1034	43·41	375·37	26·27	43·67
Total	48·0	1032	109·17	1075·36	58·87	93·96

INTERPAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	93·5 oz.	1016	54·54	572·68	29·60	29·38
2	99·5	1014	35·11	418·70	31·50	29·78
3	89·0	1013	64·89	414·00	31·15	26·64
Total	282·0	1014	154·54	1405·48	92·25	85·80

Here is also a second analysis of the urine during the paroxysmal period in the same case; this time he made water so sparingly and irregularly, that it was only obtained every forty-eight hours.

PAROXYSMAL PERIOD.						
Hours.	Quantity.	Sp. gr	Cl Na.	Urea.	PO_5.	SO_3.
48	32·5 oz.	1032	94·79	687·23	42·25	49·30
48	36·0	1031	52·50	645·75	48·00	59·26
24	32·5	1023	18·95	398·12	29·79	27·72
Total	101·0	1028	166·24	1731·10	120·04	136·28

The average of these five days is less than the average of the three interparoxysmal days.

XV. Peter H., aged twenty-four.—An epileptic; fits occur monthly, and he becomes excited, maniacal, and violent.

PAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	31·0 oz.	1021	67·81	379·75	22·74	21·76
2	26·5	1030	54·10	456·02	26·07	23·80
3	40·5	1025	59·06	472·50	10·70	26·68
Total	98·0	1025	189·97	1308·27	59·51	72·44

INTERPAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1 2 3	95·0 oz. 91·5 85·0	1017 1014 1015	152·39 226·84 111·56	881·19 800·62 614·83	60·59 32·58 40·40	45·51 27·39 34·36
Total	271·5	1015	2296·64	2296·64	133·57	107·26

There is a second analysis in this case, also with the same result.

PAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1 2 3	21·25 oz. 20·75 33·00	1031 1030 1029	46·48 39·33 33·68	570·20 502·18 596·75	33·10 14·07 20·40	20·67 19·30 31·60
Total	75·00	1026	119·49	1669·13	67·57	71·57

XVI. Helen C., aged twenty-six.—An epileptic; fits occur every three weeks; she becomes very excited and violent, and talks incoherently.

PAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1 2 3	22 oz. 7 7	1030 1034 1030	77·00 21·41 20·41	385·00 136·79 147·00	31·18 8·17 5·37	23·00 11·00 7·85
Total	36	1031	117·82	368·79	44·72	41·85

INTERPAROXYSMAL PERIOD.						
Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1 2 3	35·0 oz. 73·5 51·0	1012 1006 1012	20·41 42·87 29·48	240·20 192·93 267·75	22·00 16·21 21·25	7·85 9·80 15·87
Total	159·5	1010	92·76	700·88	59·46	33·52

In this case, again, we observe a comparatively large excretion of salts, phosphates included, on the first day; then an extreme fall in the quantity of the urine and its constituents on the succeeding day, which reduces the amount of the urea and phosphoric acid of the paroxysmal period below that of the inter-paroxysmal.

The first fact observed on examining these tables is the remarkable diminution of the quantity of the urine which takes place during the course of a severe maniacal attack. This decrease appears to have an inverse relation to the rapidity of development and the intensity of the paroxysm, for in the milder cases it is not nearly so great. Nor is this wonderful when we consider how much of the watery elements of the blood must find an outlet through the skin as a consequence of the muscular exertions which accompany the restlessness, violence, and gesticulation of mania. The specific gravity of the urine in such attacks is also high; there is an excess of solids, and, on standing, a considerable quantity of sediment, especially of urates, is deposited. Owing to the want of a volumetric test for uric acid, I have been unable to subject this element to examination. The per-centage amounts of all the organic and inorganic constituents are raised very far above the normal. In all my cases the urine was acid—very intensely so in the more severe forms—and in this my experience agrees with that of Sutherland.

Out of 16 cases the quantity of chloride of sodium was found less during mania than after convalescence in 14; nor is it inconsistent with dietetic and physiological principles that it should be so, for maniacal patients do not show much solicitude respecting condiments, whilst a considerable amount must find its way out of the body in other directions. The excretion of urea was diminished during the maniacal paroxysm in all the cases. The quantity of phosphoric acid excreted in states of mental excitement was less than after convalescence in all the cases except one (No. XI.), in which the analysis was made during a lucid interval and under unfavourable conditions. This, perhaps, is the most important fact elicited by the investigation, for a greater than the average excretion of the phosphates has come to be regarded as a pathognomonic phenomenon of maniacal excitement. In two cases where I had an opportunity of examining the urine immediately after the appearance of maniacal symptoms, I found that the quantity of phosphoric acid excreted on the first day was larger than the average daily excretion after convalescence; and from other observations I am disposed to believe that this often, though not always, occurs, for when the quantity of the urine is greatly diminished by a rapidly developed and severe mania, the amount of phosphoric acid is also lessened. I have known patients in whom there seemed to be a sort of suppression of urine, and from whom I could obtain no water for twenty-four or thirty-six hours. When it did appear, it was loaded with solids, but in quantity greatly below the normal. These facts would seem to suggest that the quantities of the urinary constituents excreted under such conditions are not to be regarded as anything like an absolute measure of tissue change; that, in fact, large amounts may be retained in the blood from the want of water to dissolve and wash them out. This, however, is but a suggestion, and does not interfere with the actual excretion by the kidneys, which is the question at issue.

Again, though the amount of phosphoric acid excreted on the first day is higher than the normal daily average, the period of this increased excretion is so short, and, as I have said, so inconstant, and the fall in the quantity of the urine on the succeeding days so extreme, that it would be unphilosophical to regard it as an isolated fact. The better method, then, is to ascertain the absolute amount of phosphoric acid excreted during part of the course of a maniacal paroxysm greater than twenty-four hours, and to compare it with the quantity passed during an equal time after convalescence. This I have done, and the daily results I have given of the parts of a course of mania correspond exactly with the daily results of the whole course, as I have ascertained at different times; consequently I consider it sufficiently proved that the quantity of phosphoric acid excreted during the course of a maniacal attack is less than that voided in an equal time after recovery. In 11 cases the amount of sulphuric acid excreted during convalescence was greater than during mania; in 5 cases it was larger in the latter condition.

The following table shows the mean of the average daily quantities of the urine and its constituents excreted by all the cases during mania and convalescence:—

	During mania.		During convalescence.
Quantity of urine	23·9 oz.	...	58·4 oz.
Specific gravity . . .	1025	...	1016
Cl Na	35·94 grs.	...	59·98 grs.
Urea	328·14	...	475·70
PO_5	22·14	...	30·54
SO_3	21·42	...	23·07

Cases of Melancholia.

XVII. Agnes E., aged forty-four; weighs 99 lbs.—Bodily condition feeble; suffers from amenorrhœa; is melancholy, desponding, and discontented; does no work, and never moves off her seat. In addition to ordinary diet, has a pint of porter daily.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. avoir. excretes in grs.	
1	32·0 oz.	1018	46·66	238·00	21·33	11·49	Cl Na	0·288
2	13·00	1018	15·16	87·20	7·80	6·03	Urea	1·856
3	26·00	1022	18·95	219·91	14·73	14·39	PO_5	0·153
4	21·50	1024	28·21	188·12	15·05	15·12	SO_3	0·115
5	21·25	1021	27·89	167·38	12·39	7·31		
6	24·00	1020	34·66	208·00	19·60	14·36		
Aver.	23·12	1020	28·58	184·76	15·15	11·45		

XVIII. Elizabeth R., aged forty-three; weighs 115 lbs.—Suffers from slowly progressing phthisis; fancies she is a great sinner, and that she will be damned; much depressed, and shows great apathy.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	38·0 oz.	1023	38·79	443·33	31·46	16·49	Cl Na	0·409
2	24·5	1026	42·87	357·29	24·90	17·96	Urea	4·074
3	35·5	1020	36·23	372·74	26·95	19·01	PO_5	0·289
Aver.	32·6	1023	39·29	391·15	27·77	17·82	SO_3	0·185

XIX. Eliza G., aged sixty-four; weighs 96 lbs.—A case of acute melancholia. Bodily condition fair; is restless and miserable, continually running hither and thither, expressing her sense of misery, her wretchedness, and impending damnation.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	38·0 oz.	1023	38·79	443·33	31·46	16·49	Cl Na	0·409
2	24·5	1026	42·87	357·29	24·90	17·96	Urea	4·074
3	35·5	1020	36·23	372·74	26·95	19·01	PO_5	0·209
Aver.	32·6	1023	39·29	391·15	27·77	17·82	SO_3	0·185

XX. Jane B., aged fifty-nine; weighs 126 lbs.—Bodily condition good; is depressed in spirits; fancies she is a great sinner, that she will be damned, and that all are doomed to hell-fire; she is suicidally inclined, and frequently secretes pieces of string in her bed.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	54·0 oz.	1008	31·48	141·74	15·30	8·89	Cl Na	0·294
2	49·5	1011	28·87	303·18	12·17	13·33	Urea	2·014
3	70.0	1011	51·04	316·45	20·57	9·43	PO_5	0·127
Aver.	57·8	1010	37·13	253·79	16·01	10·55	SO_3	0·083

XXI. Jane G., aged forty-two; weighs 149 lbs.—A mild case of melancholia, with doubts of her soul's salvation. Is quiet, somewhat depressed; works regularly.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	32·5 oz.	1020	37·91	246·45	23·83	12·64	Cl Na	0·343
2	35·5	1019	31·06	232·90	20·40	25·50	Urea	1·972
3	44·5	1023	84.36	402·35	36·34	19·33	PO_5	0·180
Aver.	37·5	1020	51·11	293·90	26·85	19·15	SO_3	0·128

XXII. George R., aged forty-six; weighs 122½ lbs.—Bodily condition fair; is melancholy and depressed, and manifests a morbid anxiety respecting his health.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	47·0 oz.	1021	82·25	390·68	29·76	21·10	Cl Na	0·522
2	72·0	1015	73·50	483·00	34·94	21·55	Urea	3·170
3	50·0	1015	36·45	291·66	18·05	8·98	PO_5	0·225
							SO_3	0·140
Aver.	56·3	1017	64·06	388·44	27·58	17·21		

XXIII. James N., aged sixty-three; weighs 149½ lbs.—Is melancholy, apathetic, hypochondriacal, and fancies he is to be hanged for his crimes; takes very little food.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	16·5 oz.	1014	12·03	110·68	6·87	5·88	Cl Na	0·0915
2	20·	1013	14·58	58·33	4·41	2·39	Urea	0·5690
3	16·5	1011	14·43	86·62	7·42	6·17	PO_5	0·0408
							SO_3	0·0322
Aver.	18·6	1012	13·68	85·21	6·11	4·81		

In this case all the amounts are very far below even the minimum of health, and they can have but an exceptional relation to the weight of the body.

When acute melancholia is accompanied by paroxysms of maniacal excitement, the urinary secretion is regulated by the same law as in acute mania—that is, the quantity of urine and its constituents is less than in the normal state, as will be seen in the following cases:—

XXIV. Helen F., aged twenty-nine. April 7, 1864.—Is much excited and agitated, crying, "Hang me, hang me!" Noisy, sleepless, expresses great sense of misery, and says she has a desire to commit suicide; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	23 oz.	1030	86·89	315·29	21·55	19·62
2	30	1032	48·12	476·87	43·86	26·50
3	24	1030	31·50	367·50	35·20	18·68
Total	77	1030	116·51	1159·66	100·61	64·80

Aug. 15, 1864.—Appears to have quite recovered; has become much stouter, and works regularly.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	66·0 oz.	1024	67·37	789·25	59·40	39·51
2	72·0	1024	84·00	861·00	64·80	50·64
3	61·5	1025	59·94	807·18	61·50	43·52
Total	199·5	1024	211·31	2457·43	185·70	133·67

Here is another case of the same nature, but I have not yet had an opportunity of examining the urine after recovery :—

XXV. Anne H., aged thirty-eight. Sept. 20–25.—Is much excited and agitated, crying, wringing her hands, and walking restlessly up and down the corridors. She is a woman of large size, bodily condition fair; pulse 103. Attempted to steal a knife, and has scratched her throat with a needle.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	50·0 oz.	1030	80·20	926·00	70·00	62·86
2	15·5	1033	31·64	334·54	26·09	11·59
3	16·0	1033	25·66	331·33	21·00	14·96
4	37·5	1030	54·68	612·50	53·12	29·06
5	28·5	1025	37·46	324·12	29·15	12·79
Aver.	29·5	1030	45·92	505·69	39·93	26·25

It will be seen that in this case, on the first day, all the constituents of the urine are in large quantity. The phosphoric acid in particular is large; but, as in the other cases where I have had occasion to notice this, on the succeeding day it falls to less than half the amount. Judging from the woman's size, I am satisfied that in the normal state and in robust health she will excrete more than an average of 39 grains of phosphoric acid.

The following cases of monomania of fear may also be grouped with the melancholic :—

XXVI. Isabella C., aged fifty-four; weighs 147 lbs.—Perpetually in low spirits, crying, and pricking her hands; expresses a dread of being killed.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	41·5 oz.	1013	18·15	254·18	20·06	12·42	Cl Na	0·184
2	39·5	1015	34·56	334·10	23·70	17·73	Urea	1·949
3	49·0	1012	28·58	271·54	15·26	8·80	PO_5	0·133
Aver.	43·3	1013	27·09	286·60	19·67	12·98	SO_3	0·090

The next case presents a comparison of the paroxysmal and chronic conditions of monomania of fear.

XXVII. Catherine M., aged twenty-eight. March 17–20.—Restless and agitated; trembling from dread of being put to death; skin cold, pulse 94; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.
1	23 oz.	1020	20·12	207·95	23·38	11·56
2	10	1030	10·79	212·91	15·66	8·23
3	18	1033	18·37	273·00	28·80	15·85
Total	51	1027	49·28	693·86	67·84	35·64

Sept. 15, 1864.—Bodily condition improved; is very obstinate and idle; often refuses her food, apparently out of dread.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.
1	42·5 oz.	1020	43·38	347·87	26·63	16·37
2	32·5	1015	18·95	255·93	21·93	12·16
3	39·5	1015	23·04	334·10	24·11	15·96
Total	114·5	1016	85·37	937·90	72·67	44·49

All these cases of chronic melancholia and monomania of fear give results very far below the mean in healthy men and women. In two cases (Nos. XVIII. and XIX.), the amount of urea is about normal. The following table gives the mean of the daily average excretion in nine cases. I have included the male and female cases in the same group, but the amounts do not differ so much as to affect the result:—

Cl Na	36·67 grs.
Urea	270·44
PO$_5$	20·04
SO$_3$	13·08

Mean excretion according to weight, in eight cases:—

	1 lb. excretes in grs. in 24 hours.
Cl Na	0·267
Urea	1·961
PO$_5$	0·139
SO$_3$	0·090

A reference to the table made from Dr. Parkes' book will show that the results as to weight are remarkably below the mean in health.

The small amounts of urinary constituents excreted by melancholics may be accounted for from their indifference to their food, their apathy, bodily torpor, languor, and inactivity. According to the prevalent theory, one would have expected a large excretion of phosphoric acid as the consequence of mental anxiety, but such does not appear to be the case.

CASES OF GENERAL PARALYSIS.

XXVIII. Alexander M'W., aged thirty-nine.—Bodily condition good; has extravagant delusions as to his wealth, and sits counting millions of money on his fingers.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.
1	80·5 oz.	1018	93·91	727·85	46·60	36·14
2	68·5	1018	89·90	579·39	44·32	28·70
3	81·5	1017	107·63	570·50	40·75	23·76
Aver.	76·8	1017	97·14	625·91	43·89	29·33

XXIX.—John F., aged thirty-seven.—Bodily condition good; manifests a general silliness of mind and manner, with exaltation.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.
1	41·0 oz.	1015	29·89	310·91	23·23	11·04
2	70·0	1016	61·25	428·75	32·66	30·16
3	66·5	1015	58·18	465·49	26·40	27·86
Aver.	59·1	1015	49·10	401·71	27·43	23·02

XXX. David B., aged forty-five.—Weighs 162½ lbs.; bodily condition, very stout; mind is extremely silly and facile.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.	In 24 hours 1 lb. excretes in grs.	
1	88·5 oz.	1020	90·34	903·43	44·07	49·00	Cl Na	0·549
2	74·5	1020	86·91	651·87	41·89	27·87	Urea	4·395
3	77·5	1019	90·41	587·70	44·82	30·15	PO$_5$	0·268
Aver.	80·1	1019	89·22	714·33	43·59	35·67	SO$_3$	0·219

XXXI. James M., aged thirty-six.—Weighs 167½ lbs.; has had several attacks of acute mania, attended with extravagant delusions; is now demented, and rarely speaks; bodily health very good.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.	In 24 hours 1 lb. excretes in grs.	
1	69 oz.	1012	80·60	527·27	64·51	47·52	Cl Na	0·591
2	64	1016	93·30	479·70	37·30	25·45	Urea	3·119
3	71	1015	103·54	560·60	50·84	39·70	PO$_5$	0·303
Aver.	68	1014	99·11	522·52	50·88	40·89	SO$_3$	0·244

XXXII. Elizabeth M'M., aged thirty-five.—Labours under a mild form of dementia; bodily condition good.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.
1	55 oz.	1014	88·22	397·83	32·56	18·11
2	65	1019	47·39	564·97	43·36	24·32
3	69	1015	70·40	579·60	29·95	11·41
Aver.	63	1016	68·67	514·13	35·29	17·94

During the acute maniacal attacks to which general paralytics are liable it is extremely difficult, more so than in any other form of insanity, to collect the urine; but I have some facts which point to the conclusion that the urinary excretion under such conditions is regulated by the same law as in acute mania.

XXXIII. Helen C., aged fifty.—Demented.

Condition.	Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
Quiet .	1	96·0 oz.	1010	224·00	358·40	30·05	22·99
Quiet .	2	61·0	1011	106·75	323·80	20·35	13·69
Excited	3	25·0	1023	54·08	262·50	22·93	16·43
	Aver.	60·3	1014	128·47	314·90	24·44	17·71

XXXIV. Thomas A., aged fifty-two.—Is excited, and has very extravagant delusions as to his wealth and powers; on the third day he became much more maniacal and destructive.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1	46·0 oz.	1014	26·83	241·50	19·16	11·01
2	42·0	1015	30·60	244·86	19·20	12·66
3	16·5	1024	21·65	170·84	10·31	8·39
Aver.	34·8	1017	26·69	219·06	16·35	10·68

XXXV. William G., aged fifty-one.—Very maniacal and destructive; urine was collected one day only.

Day.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
1 ...	18 ..	1023 ...	18·04 ...	231·0 ...	17·41 ...	13·47

These tables show that in states of excitement the quantities of chloride of sodium, urea, phosphoric and sulphuric acids are less than in the quiescent state. In the demented cases quantities are about normal—some slightly above, and some below, the mean. In two cases (Nos. XXX. and XXXI.), the excretion, according to weight, was also very near the mean healthy standard, and in No. XXXI. the phosphoric acid was above it when compared without reference to weight. In the last stage of general paralysis it is impossible to obtain the twenty-four hours' urine, but I have no reason to suppose that the result would differ much.

Cases of Dementia and Idiocy.

XXXVI. Robert C., aged forty-nine; weighs 133½ lbs.—A congenital imbecile; works on farm; bodily condition good.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	73·0 oz.	1021	117·10	585·52	45·01	33·86	Cl Na	0·670
2	67·5	1016	68·66	490·52	33·75	28·28	Urea	4·036
3	51·5	1025	82·61	540·75	37·76	34·68	PO_5	0·290
Aver.	64·0	1020	89·45	538·93	38·84	32·27	SO_3	0·241

XXXVII. David C., aged forty-four; weighs 142 lbs.—Is demented, and has been seventeen years insane; works on farm; bodily condition good.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	50·00oz.	1020	51·04	408·12	26·51	21·70	Cl Na	0·402
2	34·25	1029	64·93	532·81	23·51	24·08	Urea	3·500
3	56·00	1020	57·16	555·55	26·51	29·33	PO_5	0·180
Aver.	46·75	1023	57·37	498·82	25·76	21·70	SO_3	0·176

XXXVIII. George E., aged thirty-three; weighs 125½ lbs.—Has been twenty-five years insane, and is demented; bodily condition good; works on farm.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	56·5 oz.	1022	65·91	659·16	36·31	35·51	Cl Na	0·573
2	42·5	1028	86·77	582·60	30·72	27·98	Urea	4·679
3	31·0	1030	63·29	519·89	28·88	26·91	PO_5	0·276
Aver.	43·3	1026	71·99	587·21	31·97	30·13	SO_3	0·240

XXXIX. John T., aged twenty-two; weighs 127½ lbs.—A case of so-called acute dementia; never speaks, requires to be fed, and is quite apathetic; bodily condition fair.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	72·0 oz.	1021	84·00	609·00	54·00	31·25	Cl Na	0·558
2	65·5	1016	76·41	468·05	40·39	18·62	Urea	3·792
3	51·5	1025	53·37	373·62	17·15	18·25	PO_5	0·291
Aver.	64·0	1020	71·26	483·55	37·18	22·70	SO_3	0·178

XL. William A., aged twenty-six; weighs 98½ lbs.—A case of so-called acute dementia; sits the whole day in apathy without speaking; bodily condition feeble; ulcers on feet.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.	In 24 hours 1 lb. excretes in grs.	
1	75 oz.	1020	83·12	546·87	40·84	27·79	Cl Na	0·850
2	71	1016	122·12	387·24	36·33	28·70	Urea	4·467
3	64	1016	46·60	386·40	39·64	22·99	PO$_5$	0·395
Aver.	70	1017	83·76	440·05	38·97	26·28	SO$_3$	0·266

XLI. Susan S., aged fifty-four; weighs 93 lbs.—Bodily condition feeble; is demented.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.	In 24 hours 1 lb. excretes in grs.	
1	24 oz.	1016	63·00	238·00	11·36	10·87	Cl Na	0·726
2	37	1017	87·50	344·53	21·89	16·28	Urea	3·049
3	20	1022	52·50	268·34	13·00	10·78	PO$_5$	0·165
Aver.	27	1018	67·60	283·62	15·51	12·64	SO$_3$	0·135

XLII. Alexander C., aged thirty-one; weighs 148½ lbs.—Is demented, and never speaks; bodily condition good; works on farm.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.	In 24 hours 1 lb. excretes in grs.	
1	65·0 oz.	1020	75·83	616·14	41·77	29·18	Cl Na	0·357
2	38·5	1020	44·91	449·16	26·59	23·63	Urea	3·319
3	52·5	1015	38·28	413·43	21·08	12·57	PO$_5$	0·196
Aver.	52·0	1018	53·00	492·91	29·14	21·79	SO$_3$	0·146

XLIII.—John W., aged forty-one years; weighs 139½ lbs.—A congenital idiot; can speak but a few words; works on the farm.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO$_5$.	SO$_3$.	In 24 hours 1 lb. excretes in grs.	
1	109·5 oz.	1012	63·87	606·81	58·40	31·18	Cl Na	0·469
2	85·0	1015	74·37	842·91	41·08	30·53	Urea	4·857
3	100·0	1014	58·33	583·33	42·04	29·93	PO$_5$	0·338
Aver.	98·1	1013	65·52	677·68	47·17	30·53	SO$_3$	0·218

XLIV. William M'K., aged eighteen; weighs 70½ lbs.—A congenital idiot; bodily condition good; stature small; cannot speak; sometimes eats his excrement.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	33·0 oz.	1035	57·75	481·24	31·35	16·76	Cl Na	0·754
2	29·0	1027	50·75	380·62	25·61	17·79	Urea	6·172
3	39·0	1024	51·18	443·62	31·20	17·51	PO_5	0·421
Aver.	33·3	1028	53·22	435·16	29·72	17·35	SO_3	0·247

XLV. John R., aged forty-five; weighs 100½ lbs.—A congenital imbecile; bodily condition fair; works on farm.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	50·5 oz.	1017	44·18	441·87	22·71	21·91	Cl Na	0·451
2	59·0	1018	51·62	499·04	28·43	23·83	Urea	4·570
3	55·5	1015	40·46	437·03	22·29	19·93	PO_5	0·243
Aver.	55·0	1016	45·42	459·31	24·27	21·89	SO_3	0·218

XLVI. David C., aged fifty-six; weighs 165½ lbs.—A congenital imbecile; bodily condition good; does not work.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	98·0 oz.	1017	85·75	743·16	42·43	39·60	Cl Na	0·456
2	55·5	1018	57·98	469·43	29·42	24·91	Urea	3·725
3	47·5	1029	83·12	637·29	41·21	37·68	PO_5	0·227
Aver.	67·0	1021	75·61	616·62	37·68	34·06	SO_3	0·202

XLVII. William T., aged twenty; weighs 128½ lbs.—Has been two years demented after a maniacal attack; bodily condition good; works on farm.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	67·5 oz.	1019	59·06	472·50	37·95	28·28	Cl Na	0·499
2	80·0	1013	46·66	536·66	37·87	28·73	Urea	4·309
3	64·0	1022	84·00	700·01	60·50	37·35	PO_5	0·352
Aver.	70·5	1018	63·24	569·72	45·24	31·45	SO_3	0·244

XLVIII. Christina H., aged forty; weighs 101 lbs.—Bodily condition spare; is demented, and seldom speaks.

Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.	In 24 hours 1 lb. excretes in grs.	
1	47·5 oz.	1017	41·56	415·55	28·23	17·77	Cl Na	0·251
2	32·5	1013	14·21	208·54	14·09	9·72	Urea	2·932
3	49·0	1012	21·43	264·39	18·10	13·20	PO_5	0·190
							SO_3	0·134
Aver.	43·0	1014	25·40	296·16	20·14	13·56		

The next case shows that the urine in paroxysms of excitement, in idiocy, is regulated by the same law as in acute mania.

XLIX. Peter M'D., aged eighteen.—A congenital idiot; cannot speak; is subject to fits of fury, during which he strikes and bites every one near him.

Condition.	Days.	Quantity.	Sp. gr.	Cl Na.	Urea.	PO_5.	SO_3.
Excited	1	52·0 oz.	1021	40·95	470·16	37·29	43·35
Quiet	2	61·5	1015	38·87	412·56	40·18	55·22
Excited	3	41·5	1021	48·41	338·91	30·45	17·39
Quiet	4	78·5	1024	68·68	336·33	37·45	21·14
	Aver.	58·4	1017	49·22	396·99	36·27	34·27

The only points kept in view in the selection of the demented cases were, that they should not be of such dirty habits as to make it impossible to collect their urine, and that they should be observed under such conditions as to make a fair comparison with healthy persons—viz., that they should take their food moderately well, and be in the habit of enjoying a certain degree of exercise in the shape of work. Of course, during the collection of the urine, the latter condition ceased to operate when they were confined to the house. As regards mind, several are congenital idiots, several have been many years demented, and two are cases of acute dementia. As I have only two female cases, and their conditions of life are different from those of the males, I will dismiss them from consideration with the statement that the quantities of all their urinary excreta are considerably below the healthy mean. In the twelve male cases the chloride of sodium was present in moderate quantity, though not equal to the mean put down in Dr. Parkes' book. In five the urea was above the mean (age and weight indifferent) given by the same author, whilst the quantity excreted by a definite weight of body was greater than the mean in nine cases. The amount of phosphoric acid was less than the mean in all cases, but in none was it below the minimum; and in four cases the excretion by one pound of body weight was greater than the healthy mean. This is a very necessary distinction, because some of the cases were lads. Two, who passed a larger than average quantity of phosphoric acid according to weight, were congenital idiots who could not speak, another a case of so-called acute dementia, and the fourth had been two years demented. With such facts as these in view, and considering that in none of the twelve cases was the average daily excretion of phosphoric acid below what has been found by several observers in healthy adult men, I cannot altogether endorse Dr. Sutherland's statement that there is a minus quantity of phosphates in the urine of dementia. Indeed, I believe that the excretion of phosphoric acid is regulated more by the condition and weight of the body than by the action of the brain. No doubt, in an ill conditioned dement, who does not take his full quantity of food, the absolute amount of phosphoric acid excreted will be small compared with the healthy mean, but less so when contrasted with the mean healthy excretion by 1 lb. of body weight.

The following table gives a comparison of the mean daily excretion of 12 cases, with the mean amounts in health:—

Constituents.	In dementia.	In health.
Cl Na	64·92 grs.	177·00 grs.
Urea	517·24	512·40
PO_5	35·20	48·80
SO_3	27·03	31·11

The next shows the mean excretion in 11 cases by 1 lb. of body weight in twenty-four hours, compared with the normal mean found in the same way:—

In dementia 1 lb. excretes in grs. in 24 hours.		In health 1 lb. excretes in 24 hours.	
Cl Na	0·557		
Urea	4·311	Urea	3·53
PO_5	0·291	PO_5	0·336
SO_3	0·216	SO_3	0·214

It will be seen from these tables that the differences between the quantities in dementia and in health are not greater than occur in individual healthy cases.

The conclusions which I deduce from the whole foregoing observations are:—

1. That the quantities of the urine, of the chloride of sodium, urea, phosphoric and sulphuric acids, excreted during the course of a maniacal paroxysm, occurring in acute mania, epilepsy, general paralysis, melancholia, or dementia, are less than the amounts excreted in an equal time during health.

2. That in chronic melancholia the quantities of the chloride of sodium, urea, phosphoric and sulphuric acids are reduced below the mean, and sometimes the minimum, of health.

3. That in idiocy, dementia (paralytic and common), the urea, chloride of sodium, and sulphuric acid range above and below the normal mean of health; that in some cases the amount of phosphoric acid is greater than the mean according to weight, but in the majority of cases it ranges between the minimum and mean found in healthy adult men.

I shall be satisfied if these observations serve no other purpose than to point out the foundation upon which an exact pathology of the urine of the insane must be built. My thanks are due to my chief, Dr. Howden, for facilities given to make this inquiry.

Art. II.

On the First Formation and Development of Cartilage. By Professor Adolph Hannover, M.D., of Copenhagen.

In my memoir on the development and structure of the teeth of mammifera[1] I have shown that the formation of the cement, or bony part of the tooth, takes place through the cement germ, in a peculiar and hitherto unknown manner, by a threefold process. In the first stage the cement germ presents, as primordial germ, a limpid, clear, or slightly reddish fluid; the only solid bodies which occur in this substance are the primordial cells of the cement germ. These cells are round, more rarely oval, very pale and delicate, almost without molecules, but provided with a middle-sized, round, or oval, less frequently angular nucleus, which has the appearance of a separate vesicle, and generally contains a dark, punctiform nucleolus. After the cement germ has attained a slightly gelatinous consistence, the primordial cells begin to change, so that the cell membrane sends numerous prolongations out towards all sides, and the cells become branched or stellate. From the prolongations finer branches are given off, which inosculate with those of the neighbouring cells; the cell membrane itself begins to disappear, the nucleus becomes darker, and the nucleolus is more frequently visible than before. The cement germ now becomes more consistent, and a transparent, structureless, intercellular substance begins to form, in which the stellate cells are deposited in various layers and inosculate with each other; but as the size of the cell membrane is diminished, the branches seem to proceed from the large, round, oval, or elongated nuclei. At last the cell membrane disappears thoroughly, and the original prolongations are transformed into very fine, smooth, slightly curved, rarely stiff or straight fibres, collected into bundles, parallel or irregularly-disposed. The nucleus also disappears by degrees, and leaves no vestige. Thus closes the primordial stage of the cement germ. It becomes now transformed into a fibrous cartilage, characterized by true cartilage cells. This is the second stage of the formation. The cartilage cells appear isolated in the fibrous primordial mass, and without connexion with it. They are of different sizes, round, or slightly oval, darker than their surroundings, have coarsely granular contents, a middle-sized, coarsely granular nucleus, but no distinct nucleolus. As they increase in number, the fundamental substance at the same time loses its fibrous texture, and becomes more uniform. In the third stage of development of the cement germ, the ossification of the fibrous cartilage commences soon after the appearance of the cartilage cells; a deposition of calcareous masses is seen in the intercellular substance; as the earthy deposition increases, the cartilage cells are pressed together, become smaller, and are at last transformed into bone-corpuscles. This conversion I will not longer dwell upon here, as it will be more closely examined in the following part of this communication. I will only call attention to the formation of the medullary or Haversian canals, which already begins in the primordial germ, as soon as the cartilage cells appear, or perhaps a little later; the substance of the cartilage liquefies to the required extent, according to the direction of the blood-vessels.

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[1] A. Hannover: über die Entwickelung und den Bau des Säugethierzahn; Nova Acta Acad. Leop. Carol. Nat. Cur., 1856, vol. xxv. p. 2. Translated by Dr. T. Wharton Jones, F.R.S., British and Foreign Medico-Chirurgical Review, Jan., 1857, p. 229.

I have already, in my memoir on the teeth, hinted the supposition that possibly also the formation of the cartilage of bones was effected in a corresponding manner, and I can now perfectly confirm this for a pathological formation of cartilage—namely, for the so-called enchondroma of Johann Müller.

Without entering into a closer anatomical description of the different forms of enchondroma, I shall here only make the general remark, that enchondroma not only grows on or near bone and periosteum, where consequently its origin is easier to explain, but also at a distance from such places, as in or near the parotid gland, the testis, mammæ, and several other parts of the body. As its essential elements everywhere consist of the same hyaline, uniform, or fibrous cartilage supplied more or less with cartilage cells, it seemed probable that the manner of formation was one and the same in all enchondromata, and that these tumours took their origin in the cellular tissue, which is present everywhere in the body, and in the caudate or spindle-shaped bodies from which the cellular tissue originates. But here again the question would rise, where the source of these bodies was to be found, and why they should be developed into cartilage cells, especially in localities where neither cartilage nor bone exists in the neighbourhood. Upon the whole, microscopical anatomists have of late gone too far in attributing to these bodies a part in the formation of a very great number of the tissues and fluids of the body; a part which they, in my opinion, do not deserve, and which is to be limited to the formation of true cellular tissue, and such tissues as are immediately related to it. I do not assert that I am able to point out where a differential cell takes its origin; for, although I am willing to sign the sentence, "Omnis cellula e cellula," as well as "Omne ovum ex ovo," we must yet, for the formation of the first cell, accept a *generatio æquivoca* or *spontanea*, though with less than an absolute signification; and when some observers assert that a tissue with a decided anatomical or physiological character may be transformed into another physiological or pathological tissue of a heterologous character, such a hypothesis is only founded upon a wrong interpretation of a possibly correct observation. When I therefore demonstrate (as I intend next to do), that in the enchondroma the proper formation of cartilage passes through a primordial stage like that in the cement, I can only pronounce thus much about the first formation of the cell, which there appears; that it takes its origin in the nutritive fluid. I cannot demonstrate any other cell from which it might have arisen, and the same applies to the later existing cartilage cell.

The enchondroma may be, as is well known, either so hard that it scarcely can be cut with a knife, or so soft that it is almost diffluent. Transitions between both forms may be found in the same tumour. It forms a continuous rounded growth, or a conglomerate of small round masses or knots, which are more or less separated by cellular tissue, whilst a stronger cellular capsule may form a general investment to them all. On the cut surface the substance is spotted, white, and greyish, in some places reddish, according to the prevalence of cellular tissue or cartilage. The external tuberous character may extend into the depth of the tumour, but towards the centre the knots generally coalesce into a continuous firmer substance, and the limits of the single knots are effaced. Frequently a white skeleton is visible, spreading from the centre of each tumour, and embracing the grey cartilaginous substance in meshes of very different sizes. This substance offers the appearance and firmness of the different sorts of cartilage, but it may be as soft as gelatinous matter, or at the circumference of the knots may be diffluent. Such fluid cartilage is not to be confounded with liquid masses which may be found in other places in the substance of tumours, and which are contained in limited, round, or irregular cysts, the walls of which are smooth, or provided with small, irregular-clustered cartilaginous knots. Such cysts, combined with the universal elasticity of the tumour, may produce a sense of fluctuation, and make the diagnosis difficult.

For the examination of the formation of cartilage, tumours are to be selected, in which the circumference is formed by a soft, diffluent mass. Such tumours, e.g., near the parotid glånd, may have the size of a hen's egg; on their surface they are soft, gelatinous, reddish, granular and knobbed, like a transparent red raspberry; the single knots may have the size of a little nut, and are composed of smaller, as large as a hempseed or a millet. The granular texture may extend to the depth of 2–4 mm., and its red colour is pretty suddenly lost in the greyish or yellow firmer and elastic substance of the interior. On account of the external soft and diffluent layers, the surrounding tougher fibrous capsule, which abounds in vessels, can easily be separated from the tumour; the inside of the capsule wears the impression of the knobbed surface of the tumour, and is areolar.

This external diffluent substance is formed by PRIMORDIAL CARTILAGE. For its examination it is generally always necessary to make use of fresh preparations; for, after some time, the texture is lost. The primordial cartilage is entirely composed of cells[1] of very different sizes; they are round, clear, pale, almost perfectly devoid of molecules. Their nucleus is round or oval, more rarely elongated, or of the shape of a half-moon, finely granular, without larger molecules, a little darker than the cell, and pretty large in comparison with it. Two nuclei are very seldom seen in the same cell. The nucleolus is generally wanting, or there are one or two punctiform nucleoli. The cells appear isolated; or small cells are clustered together in larger groups, so that at the first glance only the darker nuclei are visible. Free nuclei are also found. In the primordial cartilage of teeth these cells present just the same appearance; they seem only to be in general a little smaller.

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[1] The original paper, which has been published in the Danish language in the Transactions of the Royal Danish Society of Sciences, vol. vii., is accompanied by two engraved plates, representing the microscopical forms belonging to the development of cartilage.

The first change which the cells of the primordial cartilage undergo, and of which traces may be already found in the liquid mass, is seen, when the whole cell becomes elongated, oval, and then angular; whereupon one or both ends are extended into one, or rarely more, broad processes. In all the cells this inclination to elongation is remarkable; the whole cell, together with its contents, assumes this caudate shape. The nucleus remains unaltered, and is situated in the broad part of the cell, when there only exists one prolongation. In the clear contents of the cell no change is yet observed; it preserves the same qualities as in the round cell.

The propensity of the cells to prolongate and to send out pointed processes increases, and a very great variety of forms is the consequence. The nucleus is large, seldom round, most frequently oval and protracted, with sharp outlines, a little darker and more uniform than the cell itself. Two or three nuclei are now more frequent as well in round as in angular cells; two nuclei may be seen closely connected, as if they were about to be separated from each other. The nucleolus, which was only seldom visible in the round cells, appears now with greater distinctness, and appears punctiform, or as one, two, or three little vesicles. This transformation of the round cells into angular, pointed, and stellate bodies corresponds perfectly with the same stage in the primordial cartilage of the cement of teeth; the processes from each cell are, however, in general more numerous in the cement.

The cell is next successively prolongated into a spindle-shaped body, and exactly the same forms appear as in the cement. The processes become more pointed, two or more cells coalesce in longitudinal directions, and when the cell-membrane is thoroughly protracted and not longer visible, a fibre is formed, on which the nuclei are seen in lines, at first of the same size as in the original cell, but afterwards losing their largeness and becoming straightened, so that they at last amalgamate with the fibre, and are only evidenced by some dark molecules. Free nuclei are now very rare; the spindle-shaped bodies are either situated parallel with each other in a longitudinal direction, or placed in no fixed order. All these transitions may be observed in one and the same preparation. Whilst the free round cells only are found in the liquid external substance, and become more rare towards the real tumour; the cells, which are converted into spindle-shaped bodies, begin to appear in the external red granules, which can be examined under the microscope without further preparation; for, as they are not elastic, their softness admits of their being compressed by a thin glass plate, without any disarrangement of the elementary parts.

The primordial cartilage at last approaches its final stage of development, the spindle-shaped bodies being converted into actual fibres. This is best seen in those parts of the tumour which lie immediately within the red soft granules; the substance is here still soft and granular, but less transparent, less reddish, and now and then whitish-yellow; in the meantime this stage also may be met with in gelatinous hyaline parts in the midst of hard cartilage of the tumour. The fibres are very soft and fine, so that their contour is generally on both sides defined as a dark line. They are straight, or only slightly bent, but not twisted or undulated as real cellular fibres. They are very much ramified, as a consequence of the coalescence of the former spindle-shaped bodies, and two, three, or more single branches are seen to depart from (the remains of) a nucleus and anastomose with the fibres of other nuclei. Their direction is either straight or slightly curved, parallel in bundles of very unequal breadth, or radiating in a variety of forms; sometimes they constitute complete net-works with numerous ramifications. In successful specimens a stellate radiation may be observed in one and the same preparation, covering a network. By the addition of acetic acid the fibres become paler, but otherwise they do not in general change; the nuclei, and the manner in which the fibres radiate, become more evident by this process.

As in the cement, the primordial stage of the cartilaginous formation here closes. The cells of the original fluid primordial cartilage have been transformed into fibres, and this fibrous formation now furnishes the basis of the following stage, in which real CARTILAGE CELLS appear, the origin of which has nothing at all to do with the cells of the primordial cartilage, or with the spindle-shaped bodies which have sprung from them.

The cartilage cells of the enchondroma are, like the primordial cells, larger than those of the cement. They are of conspicuous size, round, oval, or a little irregular, without being angularly or sharply defined by any fine outline. Their appearance is often as if an independent surrounding cell-membrane was missing. Their surface is coarsely granular, the nucleus is very large, round or oval, clear and without molecules, sometimes double; the nucleolus is often wanting, or substituted by an undefined, darker mass, but in general it is large, round, and darker than the nucleus. By adding acetic acid the cells become paler and less distinct; their nucleus is not so much affected as other nuclei, and appears only a little more distinct after the application of the acid. The cartilage cells are distinguished from the primordial cells by their more considerable size, their coarsely granular surface, the absence of out-running fibres, and the glittering appearance which characterizes the cartilage cell and is owing to the nucleus. Besides, they are only found, where the fibres have begun to be formed, in firmer parts of the tumour; but the differences of these two species of cells have hitherto not been heeded by observers.

It is not quite easy to find the cartilage cells in this their earliest state, although they are easily isolated. Portions are to be selected where the gelatinous, reddish, half-transparent substance is just about to become firmer by the formation of fibres. In such parts, either in the circumference of the tumour or in encircled spaces in its interior, the cells are often so numerous that they lie in groups or clusters without any intermediate basis-substance; at least this substance is not firm, but liquid. In a later stage they are often obscured by the darker fibrous substance, are perhaps proportionally less in number, and undergo some changes. Frequently they are compound, or one is contained in another, as a consequence of the continued division of the nuclei. In the peripheric parts of the cell concentric layers may be formed, so that an empty pellucid space is left between this laminated wall and the nucleus. The granular mass, which forms the contents of the cell, is, moreover, not always sharply defined; sometimes it is lost imperceptibly towards the periphery, at other times it coalesces with the contents of neighbouring cells, and forms an apparent (or real) intercellular substance wherein the nuclei are situated, and thus, as I have shown in my memoirs on the teeth, it may easily be considered to be the cartilage cell in its totality, whilst the large nucleolus is erroneously supposed to be the nucleus.

The transition from primordial fibrous formation into cartilage is made rather abruptly, and the primordial spindle-shaped bodies may under the microscope be seen only separated by a small interval from the adjoining large, clear cartilage cells, imbedded in a fibrous texture, wherein the nuclear formation of those bodies may still be discovered. Such preparations led former observers to the erroneous supposition, that the cartilage cells originated in, or were transformed from, spindle-shaped bodies.

The fate of the fibrous formation is different. In some cases it vanishes altogether, and the cartilage cells are seen imbedded in a uniform, hyaline basis-substance; in other cases the fibrous formation not only remains unaltered, but increases in quantity. When the substance is whitish-grey, elastic, and hard as cartilage, the basis-substance is either uniform without fibrous texture, as we find it in common hyaline cartilage, or the whole structure is striped and fibrous throughout. The very fine linear fibres are collected in thick bundles, and are very difficult to extricate; the bundles lie in lines straight or slightly undulating; they do not diverge from any single point, but are arranged irregularly without fixed order, interlacing with each other in different layers, so that they form angular meshes which decrease in size, the more the fibrous formation is developed in the thoroughly white firm parts. The cartilage cells are very differently disposed in those fibrous parts; in some places they appear pretty numerous, and are even collected in groups, in other places they are almost completely missing. Even before the cartilage cells appear in the focus of the microscope, their presence is previously indicated by some peculiar semi-transparent spots, the rest of the field remaining dim; when in focus, they reflect the light very strongly.

The cartilage cells have here, however, an aspect which is somewhat different from their original form. The large round, oval, sometimes double nuclei appear rather as plates than as vesicles; they are clear, and reflect the light very much, more particularly seen in older masses than in younger. If they are still surrounded by a cell-membrane, this is drawn tight round the nucleus; the nucleus is encircled by a fine, shining ring or area, which throws a shade sidewards; if this is not the proper contour of the nucleus, it must be the thickened cell-membrane either alone or possibly combined with the former contents of the cell; but I am much more disposed to believe that the cell-membrane and cell-contents have coalesced with the surrounding substance, and that the contour only belongs to the nucleus. Two or more nuclei may be seen enclosed by a common capsule; the nucleolus is large, vesicular, sometimes double. Not unfrequently the cell contains oil-drops. Acetic acid is without influence on the cartilage cells (or nuclei, which name they now rather deserve) in this stage.

The vessels are numerous, covered usually with elongated nuclei; ramifying they radiate or form meshes; sometimes they are large, dilated, and contain clots of blood.

I have not been able to trace the formation of Haversian canals as far back as in the cement, where their vestiges can be already demonstrated in the primordial germ as soon as the cartilage cells appear. In the enchondroma, the first distinct marks of the establishment of Haversian canals are seen in the circular layers and interlacements formed in the fibrous formation. A little later short ducts are discovered, which on the cut surface appear as yellow points, and are filled with small oil-drops and small oval or angular nuclei, which differ from those of the spindle-shaped bodies. They belong to the later Haversian canals, and are not owing to adenoïd formation, as supposed by some observers. Other small fatty deposits, composed of ordinary fat cells, may, besides, be found in the middle of the knots of which the tumour is formed. The collections of granule cells and masses, which we often encounter in the enchondroma, and which even may produce spots with a dark grey aspect, do not belong to the formation of the Haversian canals, but are most likely owing to softening. The granule-cells are small, almost all of the same size; they are each provided with a surrounding membrane, and, as it seems, some of them also with a proper nucleus; it is not likely that they are derived from transformed cartilage cells. In the cavities confined in and bounded by smooth walls, which are met with in some enchondromata, and may acquire the size of a nut or a walnut, a viscid fluid is generally contained, wherein no substantial bodies are found, or only now and then pale and coarsely granular masses. These cavities depend most likely upon softening, and have nothing to do with the proper formation of cartilage.

Respecting the study of the ossification of cartilage the study of enchondroma is less convenient on account of the irregular manner in which ossification frequently proceeds; and I am here not able to demonstrate the analogy with the ossification of the cartilage of the cement of teeth. I shall only remark, that the numerous cartilage cells in the hardest parts of the enchondroma, which may be considered approaching an ossification, are often irregular and shrivelled like the cartilage cells of the cement which are about to ossify. For the study of ossification in anomalous instances the callus-formation and some other new growths on normal bones are much more qualified, on account of the regularity in which the formation proceeds from the periosteum. And having demonstrated the analogy between the conversion into cartilage of the cement and of the enchondroma, I feel inclined to advance the opinion, that also in the above-mentioned formations a primordial cartilage is antecedent to the fibrous cartilage, and to the final ossification. How far the same law is available in the normal formation of bone in general it would, no doubt, be worth while to examine; very much would here depend upon a fortunate choice of objects. I will, however, not venture further on this theme, as I do not consider the number of my observations sufficiently large. One single observation may be quoted on account of the resemblance with the enchondroma. There often occurs in children and grown persons, on the last phalanx of the great toe, a peculiar and not always painful exostosis of pyramidal shape, and of the size of a pea or a little nut, often causing a great impediment in walking; during its growth it projects under the nail, which it lifts up and turns backwards. I believe that Dupuytren[1] first mentions the cutting off of such a tumour, but he gives no description of its texture. The tumour springs from the periosteum, is porous, but hard and brittle; the bony part contains distinct bone-corpuscles, but outwards, between the periosteum and the bone, the substance is less firm, fibro-cartilaginous. In its various stages of development this last-mentioned substance is perfectly like the enchondroma; the cartilage cells (nuclei) are larger, the fibrous formation and its interlacing bundles are exactly of the same quality.

Although, as mentioned in the beginning of this paper, I did not intend to give any anatomical description of the enchondroma, but only have had recourse to it in order to demonstrate the first formation and the development of cartilage; yet I cannot conclude without calling attention to the circumstance that many of the anatomical as well as microscopical forms which cause so great an inconsistency in the aspect of the enchondroma, are closely connected with the various stages of development of the growth itself, and particularly of the cartilage. The soft, half-pellucid and semi-liquid parts in the circumference of the tumour are generally the youngest layers, wherein only primordial cartilage is found with its cells; the firmer and whiter the substance becomes, the more the fibrous formation preponderates; and many old tumours are indued with so great a fibrous hardness that they scarcely can be cut. The spotted hyaline grey, whitish-grey, and white aspects, depend not only upon the relative number of fibres and cells, but also upon their different stages of development. When we finally behold the designs of the elementary parts of the enchondroma, such as made by former observers, we are struck with the variety of forms represented, which, however, compared with my drawings, and illustrated by the present communication, may receive another and more precise explanation, founded upon the different stages in the development.

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[1] Dupuytren: Leçons Orales de Clinique Chirurgicale. Paris, 1839. 2nd ed. tom. ii. p. 110. Paget: Lectures on Surgical Pathology. London, 1853, vol. ii. p. 238. Nélaton: Elémens de Pathologie Chirurgicale. Paris, 1859, tom. ii, p. 973.

Art. III.

Observations on Medical Relief, and Suggestions for Extending the Use of Workhouses to the Sick and Infirm Poor, and Harmless and Aged Lunatics. By Robert Boyd, M.D., F.R.C.P., Superintendent County Somerset Lunatic Asylum.

At the present time the overcrowded state of many of the county lunatic asylums in the kingdom, notwithstanding their being doubled in extent within the last fifteen years, and the inadequate provision for the poor in sickness, demands attention.

Instead of adding to asylums already too large for efficient management, certain wards in workhouses might be made available for chronic cases. Many of the workhouses, especially those in the country, are well situated, and could, at a comparatively trifling expense, be so arranged as to be well adapted for the sick poor, besides becoming auxiliaries to asylums for quiet, harmless, aged, and incurable lunatics, which amount to above 27 per cent. The cost of adding block buildings for chronic cases is estimated at 40*l.* a bed, whereas such necessary alterations in workhouses might be made for one-fourth of that sum, and the present necessity of removing many aged and infirm cases to the county asylum would be obviated.

At present the workhouses in this neighbourhood, which are as well situated as county asylums, are comparatively empty. One built for 400 not many years ago, has never had more than 120 occupants; it has excellent infirmary wards for the sick, which have only been partially occupied. The Chairman of the Board of Guardians wished those wards to be made more available for the sick of the district in which an hospital is much required, but was told by the Poor-law Inspector, that no application would be attended to by the Poor-law Board unless these wards were first completely isolated from the rest of the workhouse, and funds provided for the support of the hospital. In another neighbouring workhouse, equally well situated, the windows are placed so high that it is impossible for the inmates to look out, and they have nothing before them but the cheerless white-washed walls. In such a case the expense of lowering the windows, as well as of fitting up the interior in the manner directed by the

Commissioners in Lunacy, in their circular of November, 1863,[1] would be necessary.

Lunatics in Workhouses.—About one-third of the lunatics in the kingdom are in workhouses under the Poor-law, and are not subject to regular visitation; perhaps once in two or three years, in the country, they may be visited by the Commissioners in Lunacy on circuit, at their "discretion;" whereas those in county asylums are seen by visitors on an average every two or three weeks.

From the return of the Poor-law Board, it appears that the lunatics in workhouses are gradually increasing. The Lunacy Act of 1862, chap. iii. sect. 20, prohibits the detention in a workhouse of any lunatic beyond the period of fourteen days, unless in the opinion of the medical officer such a person is a proper person to be kept in a workhouse, and the accommodation therein is sufficient for his reception. By section 21, a quarterly return of the lunatics in the workhouse is to be made. Section 31 empowers the Commissioners in Lunacy to order the removal of any lunatic from the workhouse to the asylum; section 32, to visit any lunatic not in the workhouse, and to send the lunatic to an asylum; section 37 requires "the visiting committee of every union, and of every parish under a board of guardians, once at least in each quarter of a year, to enter in a book to be provided and kept by the master of the workhouse, such observations as they may think fit to make respecting the dietary, accommodation, and treatment of the lunatics, or alleged lunatics, for the time being in the workhouse, and further requires that the book containing the observations made in pursuance of this section by the visiting guardians shall be laid by the master before the Commissioners on their next visit."

The present arrangement of workhouses the Commissioners consider to be unsuited to the treatment of insane patients, where they are looked upon as paupers only by the board of guardians, and are subject to the low diet, gloomy unfurnished wards, and have not the indulgences and comforts which their malady so urgently needs. So long as the patient is not dangerous or unusually troublesome, he is kept in the cheerless wards of the workhouse, and many curable cases are there retained until their disease becomes chronic and their cure hopeless.

Owing to the pressure on the asylums, the Commissioners have sanctioned the building of wards for lunatics at Mile End Old Town Workhouse, and wards for lunatics have also been since built at

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[1] 1. Separate wards properly constructed, arranged, and furnished for the patients of the respective sexes. The dormitories to be distinct from the day-rooms, and the former to afford cubical space per patient, of 500 feet, and the latter 400. Single bed-rooms to contain at least 600 cubic feet.

2. A liberal dietary analogous to that of the asylums.
3. Ample means of out-door exercise and recreation.
4. Due medical visitation.
5. Properly qualified paid attendants.
6. Medical and other registers; records similar to those in use in licensed houses.

St. Pancras Workhouse. In some of the large towns in the provinces, wards for lunatics also exist, as at Bath and Clifton.

After the passing of the Lunacy Acts in 1845, since which most of the county lunatic asylums have been built, the parish of St. Marylebone, owing to the pressure on the county asylum at Hanwell, and the refusal of the visitors to make an exchange of the chronic and incurable cases in the asylum, for the recent and acute cases as they occurred in the parish, obtained a license for certain wards which were fitted up in the workhouse at my recommendation.[1]

The following extracts are from the Report of the Metropolitan Commissioners in Lunacy, 1844; also second published Report of the 15th Board of Auditors of Accounts of the Parish for 1846:

"In reference to the populous parish of St. Marylebone, the magistrates refused to exchange old incurable for recent and curable cases. But the professed, and indeed the main object of a county asylum is, or ought to be, the cure of insanity. The patient who has had the benefit of a trial in the asylum where he has become incurable should, we submit, give way to the afflicted pauper who is in the workhouse, or at home, and is probably curable, and equally entitled to be received at the asylum, where by prompt and proper treatment he may be restored to health and to his family, instead of being permitted to become an incurable lunatic, a source of expense to others, and of suffering to himself. A county asylum is erected for the benefit of the whole county, and is to be considered not merely a place of seclusion or safe custody, but as a public hospital for cure.

"The result of the system adopted by the Justices in Middlesex is, that the county asylum is nearly filled with incurable lunatics, and almost all the recent cases are practically excluded from it. When we visited it in March last, there were 984 patients, of whom only 30 were reported curable, and there were 429 patients belonging to the county out of the asylum, and 40 applications for admissions had been refused within less than three months from the commencement of the present year.

"In 1831, there were 300 patients, for whom there was no county asylum whatever; and in 1844, although there is an asylum holding 984 patients, there are 429 pauper lunatics unprovided for, and who, if they wait for the rota before they are admitted, will probably have become incurable, and will be lunatic annuitants upon the county or their parishes."

The following was the dietary for the insane in the licensed lunatic wards of Marylebone:

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[1] Vide Report of Lunatics chargeable to the Parish of St. Marylebone. London, 1844. W. Davey and Sons, Gilbert-street, Oxford-street.

DAILY ALLOWANCE.

	Bread.		Butter.	Uncooked meat.	Fish.	Potatoes.	Good pea-soup.	Rice pudding.	Cheese.	Beer.	Tea, sugar, and milk. Weekly allowance.
	Men.	Women.									
	oz.	oz.	oz.	oz.	oz.	lbs.	pints.	oz.	oz.	pts.	
Sunday . .	16	14	1	9	...	¾	...	...	...	1	Each person is allowed 2 oz. of tea, ½ lb. of sugar, ½ pint of milk, per week; the tea being infused in bulk, produces 1 pint of good tea for breakfast, and 1 pint for supper, for each patient daily.
Monday . .	16	14	1	...	...	...	1½	...	2	1	
Tuesday . .	16	14	1	9	...	¾	...	...	...	1	
Wednesday .	16	14	1	...	...	...	...	16	2	1	
Thursday .	16	14	1	8	...	¾	...	...	...	1	
Friday . .	16	14	1	...	...	¾	...	...	2	1	
Saturday .	16	14	1	Mutton 6 in stew	8	¾	...	...	...	1	

NOTE.—The sick dieted at the discretion of the medical officer.

Two paid head attendants, one for males, the other for females, had charge of the licensed wards, assisted by paupers.

From the table of diseases admitted to the St. Marylebone Infirmary in 1846, out of 2091 cases, 115 were of insanity, 20 epilepsy, and 13 delirium tremens, making above 7 per cent. of the whole admissions.

To the licensed wards of the workhouse 96 had been admitted, 8 died, 18 were discharged recovered, 4 relieved, and 66 remained on the 31st December, 1846.

Since the opening of the Hanwell Asylum in 1831, there have been sent there from Marylebone 255 patients; of these 106 died, 58 were discharged, 1 escaped, and 90 remained on the 31st December, 1846. Within the same period, 294 were sent to licensed houses. The total amount paid by the parish to the county asylum for maintenance of lunatics from 1st July, 1831, to 31st December, 1846, was 20,191*l.* 2*s.* 1*d.*, the average cost being 8*s.* 5*d.* per head per week.

At Marylebone the medicines were made up at the parish infirmary for both the in-door and out-door poor; besides those admitted in the infirmary in 1846, as above stated; on an average 303 were attended in the workhouse, 4220 at their own homes, and about 328 at the infirmary. The total of medical orders for advice and attendance during the year was 8924, of whom 700 died. The proportion of persons receiving medical relief as paupers, according to the population of the parish, was 139,454 at the last census, has been for the year 1 in 139. The cost of the medicines averaged nearly 600*l.* a year, and the wines and spirits about 178*l.*

Medical relief under the Poor-law Board is administered on the cheapest terms, for the most part by contract; and the poor in most cases have not the advantage of the higher class of medicines, as ether, quinine, and cod-liver oil. The Rev. C. Kingsley, in his evidence before the Select Committee on Medical Relief in 1854, states that a large number of the medical men do not get more than a shilling a case, and they are very often out of pocket by permanent cases. He says, "I have known a permanent case lie on a medical man's hand for thirteen years, during which time he was continually off and on supplying that person with medicine; and he asked for some extra remuneration for it and did not get it, and he would not in nineteen cases out of twenty." The opinion of the late eminent statesman, Sir Cornewall Lewis, was also given in evidence as follows: "The result appears to me to be, that so long as medical relief remains upon its present footing, so long as it is a system of relief connected with the other sorts of relief to the poor, and administered by boards of guardians from funds furnished by the poor-rate and under the control of the Poor-law Commissioners, no essential alteration can be made with respect to the mode of obtaining medical relief." It is the interest of those concerned under such circumstances to get rid of all troublesome cases, and since pauper lunatics have become chargeable to the common fund of the union, there is less hesitation in doing so; and as stated in one of the last Lunacy Reports, "On the most trivial grounds individuals very far advanced in life, *from* 70 *to* 80 *years of age, palsied and infirm*, whether actually of disordered mind, or *imbecile*, or *epileptic*, are likely to be manufactured into dangerous lunatics through the instrumentality of their relatives, or of officials anxious to get rid of their charge in the shortest possible mode."

The consequence is that county lunatic asylums are made general hospitals for the sick poor, and the increase in the number of their inmates in England amounts to a thousand annually for the last fifteen years. There is nothing easier than to convert a poor sick person suffering from dejection or from delirium, or in a state of fatuity, into a subject for a lunatic asylum, especially where it is the interest of the poor-law officials to do so. Feeble persons in the last stage of bodily disease, paralytic and aged persons, merely requiring suitable nourishment, with nursing and medical attendance, are frequently taken to lunatic asylums. A few cases of this kind, of recent occurrence, admitted to this institution, may here be stated. Two men, one aged seventy-two, the other eighty-two, were brought to the asylum as dangerous lunatics, the youngest requiring the assistance of two persons, one on each side, to enable him to rise from his seat; he was quite helpless, had asthma, and was confined to his bed to the time of his death, ten days after his admission. The other also died soon after. One man, aged seventy-eight, was brought a distance of forty miles; he died of pulmonary disease nine days after admission. He, like the others, was in a state of fatuity, and being troublesome to his friends who were unable to look after him, was sent here. A man aged sixty, suffering from pulmonary disease of long standing, was brought in a very low state, and died in four days. Another, a male of eighteen, an idiot and epileptic, with pulmonary phthisis and bed-sores, was brought about twenty miles from a workhouse, and died in five days. Another was brought a considerable distance, and died in seven days; a female brought a long distance was recently admitted with psoas abscess and cancer, in a very low state, and died in nine days. The relieving officer said there was no one to attend to her at home. Another relieving officer brought a patient in the beginning of the week a long distance, and said if he could have come on the previous

Saturday he would have brought two patients; but when he called for the second one in the morning, he found him in a dying state. Two cases of pulmonary disease attended with delirium, one in the male, and the other in the female infirmary, both having come long journeys, are mentally recovered,[1] but too ill bodily to be removed. Such cases show the necessity of making provision for the sick poor in workhouses on the same liberal footing as in asylums.

A poor person in fever or any other dangerous illness is as much an object for care as one who is insane; his life is equally valuable, or more so; by proper treatment he may be quickly restored to health, and his services become at once valuable to the public. Any measure providing speedy and efficient aid in cases of sickness amongst the poor would be found economical, as the same rule holds good in all acute diseases as in insanity, that recoveries are greatest in those who are quickly submitted to proper treatment. A more liberal provision for the poor in sickness would lessen the number of candidates for lunatic asylums.

From what has been stated, it is evident that *medical relief* under the present contract system is inefficient; and that so long as it is administered by the Poor-law Board, and forms a part of poor relief, it cannot be otherwise. But, in consequence of this inefficiency, poor helpless beings on the brink of the grave are often sent from their homes long distances to the county lunatic asylums, already overcrowded, one-third of those in England now requiring to be enlarged.[2] At the same time, many of the workhouses in the country are more than half empty. It has also been shown that the sick poor of all classes, under a different system—not by contract—may be efficiently attended in a workhouse.

It is proposed that wards for the sick, as well as for idiots and lunatics in workhouses, should be placed under the direction of visiting justices, the same as county lunatic asylums, who are appointed annually from the acting magistrates of the county being *ex officio* guardians of the poor, and having the greatest interest in their welfare.

It might be desirable for some of the visitors and superintendents of county asylums to meet in London during the session, and consider matters connected with the management of those institutions, such as the dietary, uniformity in keeping the records, by which information of value to the public might be obtained, and also for a simplification of the laws relative to pauper lunatics.

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[1] Extract from the 27th Annual Report of the Suffolk Lunatic Asylum, 1864. Dr. Kirkman states:—"As usual, many very old and very infirm patients have been admitted, and several in a state of great exhaustion. Four patients were more than seventy, and three more than eighty years of age on admission. Amongst the recent deaths is that of an inmate of only two days' residence. Whether these and others now in the house might not have been retained in the union-house, or might not be removed to it without any injury to themselves, is a question still awaiting a satisfactory answer."

[2] It appears from the Seventeenth Report of the Commissioners in Lunacy for 1863, that plans for new additional asylums for Surrey and Stafford had been approved and sanctioned, and for the enlargement of Denbigh, Nottingham, Norfolk, Wilts, and Lancaster, and according to their eighteenth report, the following asylums are nearly or quite full: The "Three Counties' Asylum," Bucks, Devon, Rainhill, Leicester, Abergavenny, Colney Hatch, Hanwell, Oxford, Salop, Suffolk, North and East Ridings, Bristol (borough).

ART. IV.

Cases illustrating the Formation of Morbid Growths, Deposits, Tumours, Cysts, &c., in connexion with the Brain and Spinal Cord, and their Investing Membranes. With Observations. By JOHN W. OGLE, M.D. Oxon., F.R.C.P., Assistant-Physician and Lecturer on Medical Pathology, St. George's Hospital.

(*Continued from No. 68, p. 492.*)

A.—THE BRAIN AND ITS MEMBRANES, CONTINUED.

II. PURULENT DEPOSITS.[1]

THESE will be subdivided into (1) those which are *unconnected*, and (2) those which are connected, with disease of the ear.

I. THOSE UNCONNECTED WITH DISEASE OF THE EAR.[2]

CASE LXXVI. *Abscess in the* RIGHT *Cerebral Hemisphere, consequent upon Carcinomatous Ulceration of the Face and Right Orbit. Absence of Cerebral Symptoms.*—William S., aged seventy-nine, died Nov. 22nd, 1834, with carcinomatous ulceration of the integuments and bones of the face and of the lower and outer walls of the right orbit. During the whole of his disease there had been no symptom pointing to disease of the brain.

Post-mortem Examination.—Cranium: The bones of the face and of the right orbit were greatly affected by carcinomatous disease, and there was an ulcerative perforation of the sphenoïd bone near the optic foramen, and corresponding to the hole in the bone was an opening in the dura mater. In the substance of the right cerebral hemisphere, corresponding to the perforation of the dura mater and sphenoïd bone, and near the surface of the convolutions (which were much flattened), was an extensive cavity, with vascular parietes. This was comparatively empty, but had contained a large amount of pus, which had escaped through the above-described apertures in the dura mater and bone. The other parts of the brain were quite healthy.[3]

CASE LXXVII. *Abscesses (secondary) in most parts of the Brain. Purulent Matter in Arachnoïd Cavity. Abscess in the Liver, communicating by a Sinus with the Surface of the Body.*—James P., aged twenty-five, admitted April 29th, 1846. A painter, who, five weeks previously, when at work, suffered acute pain at the right side of the abdomen, but was much relieved in six or seven days. After a time the pain recurred, and he had to take to his bed. He had never suffered from lead poisoning, colic, or palsy of the muscles, &c. When admitted, his countenance was distressed, skin hot, but pulse tolerably quiet; heart's sounds natural; tongue clean, and bowels acting. He had much griping pain, chiefly at the right side of the belly, and some vomiting. The abdomen was distended and flatulent, and its muscular walls were hard and contracted. There was a slight blue line at the edge of the gums. Urine healthy. Ordered to have a hot bath, and an enema whilst in it, and afterwards to have the abdomen fomented, and to take alum and sulphate of magnesia in the infusion of roses. He so far got well as to be on the point of going out, when he was suddenly attacked with so described "chills and heats." He subsequently became thinner and weaker, and eventually a healthy-looking abscess pointed and burst at the umbilicus, and from this abscess purulent matter would gush out by pressure at the right hypochondrium and right lumbar region, but not on pressure in the right iliac region. Strengthening diet, opiates, fomentations, and at times leeches to the part, were required; and things went on the same until the pus suddenly became tinged with bile, and purulent matter also appeared in the stools. The patient became weaker, rigors and diarrhœa came on, and he sank, becoming delirious and then comatose, into a typhoïd state, and so died, October 3rd, no paralytic symptoms supervening.

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[1] Purulent deposits about the membranes in connexion with meningitis are not included.

[2] Cases of disease of the sinuses or of meningitis in connexion with disease of the ear will appear in another place.

[3] The case is described in the Hospital Path. Catalogue as No. 23, Series viii.; also by Cæsar Hawkins, Esq., in Trans. of Royal Med.-Chir. Soc., vol. xxi. p. 69.

Post-mortem Examination.—Cranium: Small elevations of the dura mater were met with in several parts of the upper surface of the hemispheres; and these were owing to collections of pus in the cavity of the arachnoïd. These deposits were very numerous, and varied in size from the dimensions of a split pea to those of a sixpenny-piece. On removing the membranes, multitudes of small collections of pus, all below the size of a pea, were found studding almost every part of the brain and cerebellum, cortical and cineritious parts alike, including the corpus striatum, optic thalami, and pons Varolii.[1] In some parts these collections of pus were tinged with blood, and in most cases the surrounding brain was softened. The ventricles presented nothing unusual, nor was the brain-substance particularly vascular. *Thorax:* There were commencing secondary deposits in the lungs, and indications of recent pleurisy. Heart quite natural. *Abdomen:* The opening in the abdominal walls near the umbilicus was found to be connected with a sinus, which was traceable to a small abscess in the liver, the contents of which were highly tinged with bile. Another very large abscess, and some smaller ones, also existed in the liver, having no communication with the external opening. The greater part of the large intestines were congested, having many ulcers on their inner surface. Other organs natural. (213.)

CASE LXXVIII. *Abscess in the* LEFT *Cerebral Hemisphere, communicating with the Left Lateral Ventricle, following a Scalp Wound. Convulsions before Death.*—E. A., aged fifteen, was admitted May 5th, 1846, with a slight superficial scalp wound at the upper and left part of the forehead, just received from a fall. Drowsiness supervened, from which he recovered, but it returned twice. On the 16th of the month great head-ache and quickness of the pulse came on, and on the 19th two attacks of convulsions. Antimony and calomel were given, and salivation induced. Subsequently delirium and frequent crying, owing to pain, came on; also head-ache; and the right pupil became dilated and insensible to light. Relief was obtained from leeches and a blister, and the wound quite healed. Later on the evacuations were passed involuntarily, and he had spectral illusions, but answered questions sensibly until shortly before death, which occurred on the 31st.

Post-mortem Examination.—Cranium: The scalp was quite healed. There was a fracture of the left side of the frontal bone above the brow, which passed into the orbital plate, which was partly depressed. At this part the opposed layers of the arachnoïd were adherent, and a slight amount of blood was found effused between the bone and dura mater. The anterior part of the left cerebral hemisphere was softened, and in it was a cavity with circumscribed walls containing purulent fluid, and communicating with the anterior cornu of the left ventricle. Both lateral ventricles were full of thick pus, but their walls were natural. At the base of the brain much pus and recent fibrin existed in the arachnoïd cavity and in the sub-arachnoïd spaces, but not extending over the medulla spinalis. *Thorax:* The lungs were congested. (125.)

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[1] In the University College Museum, Preparation Y. 54, 3672, shows a large cavity in the left portion of the pons Varolii, which appears to me to have been the cavity of an abscess.

CASE LXXIX. *Abscess in the* LEFT *Cerebral Hemisphere, following a Scalp Wound* (*without fracture*). *Hemiplegia on the opposite side of the Body.*—Philip B., aged twenty-five, received a blow on the left side of the head, and about three weeks afterwards severe head-ache, followed by rigors and sweating, came on, articulation became affected, and slight paralysis of the muscles of the *right* side of the body supervened. The patient was brought into the hospital November 24th, 1847, when a sinuous opening in the scalp leading to exposed bone was found to exist. His symptoms were relieved by treatment, but again became severe, and complete paralysis of the right side came on. The cicatrix of the wound was laid open, and three circles of bone removed by trephine, allowing a quantity of foul pus to escape through an ulcerated sloughy opening in the dura mater. The patient, however, died December 7th.

Post-mortem Examination.—Cranium: The skull was free from any fracture. Through the trephine openings in the skull the dura mater projected, being pushed outwards by the brain. Here this membrane contained a sloughy opening, leading down into an abscess situated in the posterior part of the *left* cerebral hemisphere. The walls of this abscess were firm and distinct, but the brain-substance around was quite pulpy, and to a great extent of a lemon colour.[1] The septum lucidum was much softened. *Thorax:* Lungs congested. Much red fluid in pleural cavities existed. Other organs natural. (244.)

CASE LXXX. *Abscess in the* LEFT *Cerebral Hemisphere. Partial Hemiplegia on the* RIGHT *side. Convulsions.*—William McG., aged thirty-five, admitted February 28th, 1850, having had cough for many years, and being unable to follow work, owing to weakness. On the 20th he began to feel a numbness of the *right* arm and leg, and gradually lost power of movement in those limbs, until the 24th, when, in the night, he had a "fit," with partial loss of consciousness, lasting from four to seven A.M. After this, all power of movement in the affected side was lost. *Sensibility of the skin, however, remained entire.* When admitted, he had quite the aspect of a phthisical patient, but the cough was not very great. Much head-ache was complained of, but his mind was unaffected. Bowels regular; tongue clean. Aperients were given, and he was cupped on the neck; and as the head-ache was not relieved, cold lotion was applied to the head, and leeches behind the ears. Vomiting came on, unaccompanied by abatement of head-ache, and eventually great prostration of strength and listlessness ensued. There was no return of power in the arm. He gradually sank and died March 10th.

Post-mortem Examination.—Cranium: The cerebral convolutions were flattened, especially where corresponding to the parietal fossæ of the left hemisphere, where they were of a greenish colour, and very softened. At one-fourth of an inch below the surface, at this part, was a circumscribed abscess, the size of a small apricot, situated above and to the outer part of the roof of the lateral ventricle, containing dirty greenish pus, and lined by false membrane. Beyond this, for a line in thickness, the brain was dark and considerably softened. Moreover, the consistency of the entire brain was diminished. There was not much fluid in the ventricles. *Thorax:* Patches of extravasated blood existed in the lungs. The heart was small; the left ventricle soft and flabby; the valves natural. *Abdomen:* The kidneys were congested; the spleen large and soft. (46.)

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[1] Preparation of Brain in Hospital Path. Catalogue, Series viii. No. 28.

CASE LXXXI. *Abscess in the* RIGHT *Cerebral Hemisphere. Other parts of Brain Softened. Purulent Fluid in Ventricles. Symptoms like Ague. Partial Hemiplegia on the* LEFT *side.*—Thomas B., aged twenty-six, admitted February 27th, 1850. He had been in good health until the 23rd, when he was seized with paralysis as to motion of the LEFT side of the body, but did not at all lose consciousness, nor was sensibility of the skin MUCH effected. On admission the left leg was much less affected than the arm, and was only slightly dragged in walking, the mouth was quite drawn to the right side, and speech was very indistinct. There was much pain in the head. Pulse full, but quiet. The tongue clean; bowels open. He was purged and cupped to ten oz. between the shoulders, and as the pain remained the same, he was bled at the arm to eight oz., and subsequently cupped on the temples, and ice was applied to the head. He improved, the head-ache diminished, and he somewhat recovered the use of the arm. Slight ptyalism was induced by the hyd. c. cretâ. On the 24th of March severe rigors came on and he shook "like a person in ague," the ends of the fingers being white and cold. This was followed by warmth and great reaction, and during this he had a "fit," succeeded by coma, in which he died, March 25th.

Post-mortem Examination.—Cranium: The arachnoïd membrane was vascular. The sub-arachnoïd tissue was everywhere infiltrated with purulent fluid. The convolutions of the upper part of the RIGHT cerebral hemisphere were somewhat flattened, and of softer consistence than the other parts; and above the roof of the right lateral ventricle was a circumscribed abscess filled with thick greenish-coloured fœtid pus, having firm, dense walls, composed of a semi-transparent membrane of about one-twelfth of an inch in. thickness, containing bloodvessels and ecchymosed spots of blood. The inner surface of the membrane was reticulated. The surrounding part of the brain was softened, and the lateral ventricles were filled with purulent fluid, their lining membrane being very vascular. The choroïd plexus was dark. Moreover the fornix and septum lucidum and parts adjoining the ventricles were softened. (52.)

CASE LXXXII. *Purulent Deposit (Secondary?) in the* LEFT *Optic Thalamus. Softening of surrounding Brain-substance, Ulceration of the Appendix Cæci, Paralysis of the Limbs of the Right Side. Facial Paralysis on the Left Side.* —M. B., aged fifty-three, was admitted into the hospital August 31st, 1854, with scirrhus of the left breast. This was removed, and after going on well for two weeks the wound became phagedænic. On the 8th of September the patient had an "apoplectic attack," followed by coma, loss of power in the *right* leg and arm, and in the *left* side of the face, and difficult articulation. She partially recovered power in the affected arm, but bed sores came on, and she sank and died December 1st, apparently from exhaustion.

Post-mortem Examination.—Cranium: Bones healthy. The general consistency of the left cerebral hemisphere was diminished, and especially the fornix and the septum lucidum. The left optic thalamus, which to the extent of about the size of a threepenny-piece was of an ochrey colour, was very much softened at its posterior and upper parts, and contained a quantity of purulent deposit. Much of the left corpus striatum and also of the neighbouring parts of the brain were extensively softened. The lateral ventricles were large and full of limpid fluid. *Thorax:* Organs natural. *Abdomen:* Kidneys much diseased, and one of them contained a mass of fibrin in its substance. The appendix of the cæcum was thickened and ulcerated, and behind the cæcum was a large quantity of fœtid pus.[1] (369.)

CASE LXXXIII. *Abscesses in both Hemispheres of the Brain, including the Left Hippocampus Major, and in the Cerebellum. Paralysis of the right Arm. Convulsions.*—Walter W., aged twenty-three, admitted March 13th, 1856; a footman, who had been ill three weeks with shivering, languor, and feverishness, owing, as was thought, to "cold." When admitted he was rapidly falling into a typhoïd state, but no spots were found on the skin. He had also pain in the head, and had lost the use of the *right* arm, the sensibility of its surface being also partially destroyed. Pulse full, 88; scalp hot; tongue foul; countenance depressed. Ordered salines and chloric æther, and leeches to the temples, and beef-tea. The pain in the head was relieved, but sickness came on, and later still he was quite unable to answer rationally. Sordes accumulated, and the tongue became dry and raw. The right arm became certainly less paralysed. Eventually he had a succession of "fits," and died March 22nd (the paralysed arm at the time being flexed on the chest).

Post-mortem Examination.—*Cranium:* Dura mater very congested. Cerebral convolutions much flattened. A slight amount of recently-formed fibrin was found beneath the arachnoïd membrane covering the left hemisphere. Moreover, several abscesses were met with in the substance of the brain; two in the *right* hemisphere, about half an inch from the surface and of the size of a filbert; a largish one about the centre of the *left* hemisphere surrounded by smaller cavities of pus; two others also at the posterior, and one at the anterior part of the same hemisphere. The left ventricle contained some pus and fibrin shreds, and the septum lucidum was softened. Collections of purulent matter were also met with in the left hippocampus major, and the left optic thalamus; and in the centre of the cerebellum was an abscess. In all these cases the purulent collections were surrounded by a zone of bright vessels. *Thorax:* An abscess existed in the right lung; and a quantity of darkish fluid was found in the right pleural sac, having apparently been derived from the stomach through a hole in the diaphragm. *Abdomen:* A ragged hole in the walls of the stomach existed, apparently produced by the gastric juice.[2] (69.)

CASE LXXXIV. *Abscess of the* RIGHT *Cerebral Hemisphere in connexion with Caries of the Cranium and perforation of the Dura mater* (*Syphilitic.*)—John C., aged thirty-five, admitted July 11th, 1856. He had had syphilis five years before, and three years previously had been in hospital for diseased bones of the head. Since then pieces of dead bones had been removed. For three weeks before he came to the hospital he had been delirious and eaten very little, and on admission was very weak, and showed a great tendency to sleep, having also a wild and vacant expression; at times forgetting himself, although a few seconds before he could reply to questions, but with some hesitation. The pulse was weak and quick. He had been blistered. He went on in the same way for several hours, when he became very drowsy, and so remained until death, which occurred on the day after admission.

Post-mortem Examination.—Two ulcers existed in the fore-head a little to the right of the middle line, and one and a half inch from the superior orbital ridge, discharging sanious matter. *Cranium:* Corresponding to the ulcers above-named of the scalp was a deep ulcer in the frontal bone, penetrating to the diploë, and also a second one, penetrating the entire thickness of the cranium, having a piece of loose bone in connexion. The veins of the diploë were healthy. The dura mater corresponding to the ulcers was shreddy and covered with fibrin, and dark coloured; and in one place was perforated by an opening which was only blocked up by adhesions to the subjacent brain. The surface of the brain was dry and smooth; the cerebral veins and sinuses natural. The anterior two-thirds of the right cerebral hemisphere were converted into a collection of fœtid pus, the surrounding brain-tissue being softened. The walls of the ventricles were very much softened, and the corpora striata and optic thalami were of a leaden grey colour. The entire brain was somewhat softened, and the ventricles contained much turbid fluid, and some recent fibrinous shreds floating about.

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[1] Preparation of Brain, in Hospital Path. Catalogue, Series viii. No. 31.

[2] I have notes of a similar instance of (apparent) post-mortem solution of the walls of the stomach and diaphragm in a case of caries of the internal ear producing cerebral arachnitis, but no abscess of the brain.

Microscopical Examination.—The walls of the abscess and the surrounding brain-tissue presented the following appearances: (*a.*) Vast numbers of circular, oval, and irregular double-contoured globules of brain-fat.—(*b.*) Many old empty nerve-tubes, mostly like bits of broken thread. (*c.*) Occasional cells like pus, many of them being contained in a pale, oval, slightly granularly-shaped cell-layer. (*d.*) Broken bloodvessels, many with blood-globules inside, and some with granular speckled walls, but none with any decided fat-globules in connexion. (*e.*) Oval and round small cells, pale, with slightly granular contents. (*f.*) Angular cells with obvious fatty contents. (*g.*) Loose blood-globules. (*h.*) Granular particles. (*i.*) Some very large, rounded, pale vesicles, varying from the size of pus-globules to three times the size. No fibres and no granular corpuscles were met with in any part.

The other organs of the body were natural. (162.)

Case LXXXV. *Abscess of the* LEFT *Cerebral Hemisphere. Thrombosis of Cerebral Sinuses. Hemiplegia on the* LEFT (*the corresponding*) *side of the body.*—Robert S., aged twenty-six, was admitted into the hospital August 13th, 1856, with well-marked pneumonia on the left side, having, as he said, only been ill a few days with his chest, but having had head-ache for many months, and having at times been subject to an involuntary spasm of the right arm. After recovering from the affection of the lungs, the head-ache continued, chiefly at the back, and he had the feeling as of his "*eyes being forced out of his head.*" Owing to his having onyx in the left eye, and failure of sight in the right one, he was placed under the surgeon's treatment, but quite lost the sight in the right eye. Subsequently he had a "fit," the *right* side being chiefly affected, in which he struggled much, and the mouth was much drawn; after the fit he remained hemiplegic on the *left* side. He was often nauseated, and vomited phlegm, but no food. Strabismus supervened, and a peculiar smacking of the lips, as if he was thirsty, but he could not or would not swallow. The skin became hot and dry, and febrile excitement set in; and at times there was twitching of the RIGHT leg and arm, when the skin of those parts would lose sensibility to touch. The left leg was, however, drawn up when touched. At times a moving to and fro of the left arm was experienced. The upper eyelid on the right side would remain only half closed when he was desired to shut the eye, and there was decided partial paralysis of the *right* side of the face. The conjunctiva of the right eye became much inflamed and dry, and the cornea became so opaque that the pupil could not be seen. The evacuations were all passed involuntarily. He had several general convulsive attacks, and he gradually sank and died.

Post-mortem Examination.—*Cranium:* The bones of the skull, as also the external surface of the dura mater, were natural. The superior longitudinal and the left lateral and left petrosal sinuses, as far as the beginning of the internal jugular vein, were plugged up by firm blood-coagulum, which, though on the whole firmly adherent to the walls of the sinuses, was in places quite diffluent, and broken down into a grumous fluid. Similar clots were found in many superficial vessels between the convolutions. In the arachnoïd sac on the left side of the skull, purulent fluid and fibrinous material existed. The inferior and posterior part of the middle lobe of the *left* cerebral hemisphere was slightly diminished in consistency, and about one-third of an inch from the surface of the brain at this part was a cavity of the size of a hazel-nut, lined by a soft fibrinous material and containing pus. The thin portion of brain separating this abscess from the surface was softened. Much turbid fluid and fibrinous shreddy material existed in the lateral ventricles adherent partly to their walls and to the choroïd plexuses.

Microscopical Examination of the softened part of the middle cerebral lobe showed the presence of granular and refracting matter, and the coating of the walls of the capillaries by fatty matter, with here and there granular bodies of the size of pus-globules, and occasional ones of a much larger and conglomerate nature, and of a dark grey colour. The fibrinous material adherent to the choroïd plexuses and walls of the ventricles contained a large quantity of fat and granular matter, with occasional crystalline particles and numbers of delicate round cells of the size of pus-corpuscles, with here and there larger cell-bodies, which in some instances had aggregations of refracting and granular particles on their surface.[1] (222.)

CASE LXXXVI. *Abscess in the* LEFT *Lobe of the Cerebellum. Recent Extravasation of Blood in the Right Hemisphere of the Cerebrum. Symptoms following upon a Fall.*—Eliza W., aged forty-six, was admitted March 25th, 1857, having been ill since a fall which she had thirteen weeks previously, followed by bleeding at the nose, head-ache, and frequent vomiting. For the three weeks before admission, the sickness had been constant and severe, and there had been a gradual decline of mental vigour. When she came into the hospital, she was partially delirious. The tongue was very dirty, the bowels costive, the pulse very weak, the pupils of the eyes sluggish, and there was slight cough. Two days later she was very delirious, and when she slept, which was but to a slight extent, she was groaning and talking much. Evacuations were passed involuntarily, and she died, apparently from exhaustion, April 2nd.

Post-mortem Examination.—The body was much emaciated; the blood in the body was generally very fluid. *Cranium:* The skull was very thick, and the diploë very slight; the inner surface of the cranium was much pitted by Pacchionian bodies. The cerebral membranes were natural, but the convolutions of the surface of the brain were very much flattened, which appeared as if owing to the pressure of the concentric hypertrophy of the skull, inasmuch as the fluid in the ventricles was by no means sufficient to account for the flattening. In the lower part of the posterior lobe of the brain on the right side was a large loose clot of apparently fresh blood, and the brain around was broken down. In the left side of the cerebellum was a bilocular cavity, equal to two hazel-nuts in size, containing a quantity of healthy-looking pus. The walls of this cavity were easily dislodged from the substance of the cerebellum, which was softened around. The corpus dentatum was obliterated. The arteries at the base of the brain were very atheromatous. (76.)

CASE LXXXVII. *Abscess of the* RIGHT *Corpus Striatum, discharging into the Right Cerebral Ventricle.*—William S., of apparently middle age, admitted Sept. 29th, 1858. His previous history could not be ascertained, but he was, on admission, complaining of great pain in the back of the neck and in the head. He died in great suffering, in the course of a few hours.

Post-mortem Examination.—*Cranium:* The upper part of the right cerebral hemisphere was of a yellowish colour, and softer than natural. In the anterior part of the corpus striatum, on the right side, a collection of purulent matter was found, enclosed in a dense firm capsule (of the size of a walnut), which at one part had burst and discharged into the right ventricle, which was full of pus.[1] The neighbouring parts of the brain were softened. The walls of the abscess when examined *microscopically* were found to be composed chiefly of fibrous tissue. Much purulent matter and recent fibrin formed in the sub-arachnoïd spaces at the base of the brain. Other organs of body natural. (236).

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[1] This case has been related in Trans. of Path. Soc., vol. x. p. 20, in connexion with the plugging of the cranial sinuses.

CASE LXXXVIII. *Abscess of the* RIGHT *Cerebral Hemisphere. Coma. Contraction of the Muscles of the* LEFT *Arm, which was paralysed as to motion.*—Anne R., aged thirty, admitted June 16, 1856. An intemperate prostitute who had been intoxicated for the space of two days before admission. It was not known by her friends that any cerebral symptoms had ever previously existed; but she had been quite comatose for twelve hours before admission. At that time she could only just try to open her mouth when asked; the evacuations were passed involuntarily. The pupil of the *right* eye was very dilated; there was no want of equilibrium in the features; the left arm was quite devoid of motor power, but was not without sensibility of the skin. The biceps of the *left* arm was strongly contracted. Purgatives, as also wine and ammonia, were given, and a blister applied to the neck. For almost a week the patient lay as above described, perspiring plentifully. Counter-irritation was renewed, but no change occurred, excepting that the breathing became much embarrassed. She died on the 22nd June.

Post-mortem Examination.—In the anterior part of the *right* cerebral hemisphere was found a large abscess containing greenish-yellow offensive pus, extending from the anterior border of the corpus striatum almost to the posterior part of the hemisphere, only being separated from the brain's surface by a very thin layer of cerebral matter, which was conspicuously CONDENSED. The arachnoïd membrane was healthy. The abscess was lined by a granular membrane. The dura mater lining the base of the cranium, covering the temporal bones &c., as also the veins and sinuses, were quite healthy. The temporal bones were not examined. Other organs of the body natural. (170.)

CASE LXXXIX. *Abscess in the Anterior Lobe of the* RIGHT *Cerebral Hemisphere following Scalp-wound. Arachnitis. Pus in Superior Longitudinal Sinus.*—Charles F., aged forty-four, was admitted May 8th, 1862, having been pulled to the ground by another man, but not made insensible, with three or four scalp-wounds over the right part of the forehead, penetrating to the bone. There was some puffiness of the scalp and eyelids. He went on well for a day or two, and then rigors came on, the pulse became throbbing and 108 per minute, the skin dry, and the tongue creamy. Rigors returned, pain was felt in the ankles and shoulders, and he sank and died May 25th.

Post-mortem Examination.—The outer surface of the cranium was very slightly roughened; pus was found between the bone and the dura mater opposite one of the scalp-wounds; also much pus and recent fibrine in the arachnoïd cavity. At one part the dura mater was for one inch in circumference ulcerated, and in the brain-substance beneath was an abscess. The entire anterior lobe of the brain on this, the right side, was much softened.

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[1] In St. Bartholomew's Hospital Museum, Series vi. No. 22, is a specimen showing abscess in the anterior lobe of the cerebrum, which communicated with the lateral ventricle of the same side, removed from a man aged forty, who was exhausted by syphilis and mercury; also another one in the same series, No. 47, showing a similar communication between an abscess in one cerebral hemisphere and the lateral ventricle, from a child aged four, who had suffered from a scalp-wound and exposure of the cranium.

Purulent fluid existed in the superior longitudinal sinus. *Thorax and Abdomen:* Scrofulous deposits were found in the lungs, which were congested, and the kidneys had adherent capsules. (141.)

CASE XC. *Abscess in the Anterior Lobe of the* RIGHT *Cerebral Hemisphere, following Fracture of the Occipital Bone. Facial Paralysis and Spasm before Death.*—Michael M., aged twenty-five, was admitted August 9th, 1862, having, whilst drunk, sustained a compound fracture of the occipital bone. Head-ache came on two days later, also restlessness, and slight want of power in the muscles of the right side of the face. The pupils of both eyes were dilated and sluggish. He went on the same until the 24th, when he was seized with twitchings of the muscles of the face. Coma rapidly came on, and he died on the 24th.

Post-mortem Examination.—Cranium: The occipital bone on the right side was found to be fractured for the length of two inches only. On both sides the upper surface of the cerebral hemispheres was smeared over by a thin layer of blood. The white portion of the anterior lobe of the right cerebral hemisphere was bruised, and between this part and the surface of the brain, near the orbital plate of the frontal bone, was an abscess, the whole pia mater of the neighbourhood being thickened and injected. The lateral ventricles were distended with purulent fluid, and their lining opaque. At the whole of the base of the brain recent fibrin existed in the subarachnoïd tissues. (228.)

CASE XCI. *Abscess of very large size in the* RIGHT *Cerebral Hemisphere, following a Compound Fracture of the Right Parietal Bone of the Skull. Coma and stertor before Death.*—William B., aged sixteen, having fallen eleven feet from a height, was admitted Aug. 13th, 1862, in a half stupid state, but capable of answering questions, and having sustained a depressed fracture of the occiput, and scalp wound corresponding, through which some matter projected thought to be brain. On the day after admission his mind was quite clear, excepting that he had no recollection of the accident. The pulse was quick; there was no pain, and the pupils were natural. Slight pain in the head and puffiness of the wound came on later; the pulse rose, the tongue became white. An incision into the wound was made, and much discharge, mixed with brain substance, took place. The patient went on well until the 26th, when he suddenly became unconscious; stertor and dilatation of the pupils came on; the pulse fell to 52, and he died on the 27th.

Post-mortem Examination.—Cranium: A circular fracture of the lower part of the right parietal bone existed on the right side of the skull, equidistant from the anterior and posterior margins of the bone. This was of about the size of a crown piece, and contained several angular fragments. On the outside of the dura mater, close to the fracture, were a few flakes of bloody coagulum, and a portion of bone was left adherent to it on removing the calvarium. Corresponding to this a small amount of recent fibrin was found on the cerebral hemisphere, on breaking through which a large quantity of creamy pus, faintly tinged with blood, came out. This had been contained in an abscess, which extended from the part corresponding to the injury to the outer wall of the right lateral ventricle, being only limited from this cavity by its lining membrane. The abscess was so large as to pass into both the anterior and the posterior lobe of the hemisphere, so that all the outer part of the middle lobe had been destroyed. The other parts of the brain were natural. (231.)

CASE XCII. *Abscess in the* LEFT *Cerebral Hemisphere. Left Ventricle full of Pus. Dysphagia. Misapplication of Words. Spasm of the Muscles of the right Arm. Rigidity of the Muscles of the Back.*—Susan S., aged forty-four, admitted July 22, 1863, with florid face, and fairly nourished. Catamenia had been absent nine months, when two weeks before admission she was much exposed to the sun's heat, and complained of giddiness, and soon after fell into some water which was near, and was much frightened. After that her manner became changed. She miscalled objects, and could not be understood. She then became stranger, and had difficulty in swallowing, and was brought to the hospital. At that time she would not answer questions in a direct way, often murmuring in reply something unconnected with them. She often raised the hands to the head, and complained, vaguely, of being ill. No febrile symptoms existed. Pupils natural. The bowels were opened with aloes and ammonia. The urine gave a precipitate when cooled, after the application of heat and nitric acid. It was subsequently observed that the head was hot, whilst the legs were decidedly cold. The face was not, however, flushed. The tongue became furred. She never would look anyone in the face. Subsequently, a thick herpetic eruption broke out round her mouth. She became more indifferent, and the right arm became spasmodically flexed, and could not be straightened. There came on also a general stiffness of the whole body shown when she was lifted up in bed. The right pupil became more dilated than the left and less active. Before death, which occurred July 20, the right arm became gradually relaxed, but dysphagia and slight convulsions came on, and incontinence of fæces.

Post-mortem Examination.—Cranium: Membranes congested. The anterior two-thirds of the left cerebral hemisphere was broken down into a mass of greenish purulent matter; and in the middle lobe of the same (the left) hemisphere was a collection of yellow pus. The left ventricle was full of purulent fluid. Other organs of body presented nothing unusual. (181.)

Case XCIII. *Abscess (Secondary) in the Middle Lobe of the* LEFT *Hemisphere of the Brain following Amputation. Symptoms like Ague.*—The patient, a man aged thirty-five, had left the hospital after an amputation of the fore-arm. Having been frequently drunk, he was again admitted October 31st, 1860, owing to shivering, sweating, and vomiting. The rigors recurred daily, at almost the same hour, reminding one of ague. He was ordered wine and brandy, and improved slightly, but the rigors returned more or less. An abscess formed in one of the buttocks, cough and pain in the chest, and bloody expectoration came on; the general surface became very yellow, and he sank and died twenty-seven days after admission.

Post-mortem Examination.—A small part of the ulna was found necrosed, and a large abscess was found within one of the deltoïd muscles. The brachial veins were healthy, and a section of the bone higher up showed its structure to be also healthy. On removing the brain, a collection of purulent matter (of the size of a filbert), was found in the lowest part of the middle lobe of the brain on the left side. This pus was contained in a cavity lined by a granular membrane; other parts of the brain, the veins, &c., appeared to be healthy. The lungs contained secondary deposits and abscesses. The other organs of the body were healthy. (308.)

Case XCIV. *Abscess in the* LEFT *Cerebral Hemisphere. Symptoms like Ague, followed by Coma.*—Margaret J., aged thirty-eight, admitted into the Leeds Infirmary July 21st, 1864. She had previously enjoyed good health, and only been ill two weeks. Her illness began with head-ache, pain in the back, rigors, vomiting, and want of sleep; and she had had a rigor almost daily. The bowels had not been open. On admission, there was much fever and thirst; hot and dry skin; pulse 112, regular; complained of pain in the head and back; was quite conscious; aspect of countenance natural; and she expressed anxiety to get well. Ordered sulphate of quinine every six hours, with hydrochloric acid and aperients, and rice and milk diet. The rigors continued daily, and also much vomiting. This went on until the 25th, when she became unconscious, the eyes remaining fixed. There was slight trembling of the body, but no convulsive motions. The tongue was dry and brown, and she refused food. She remained unconscious several hours. Stimulants were given, and a blister applied to the nape of the neck. On the 28th, evacuations were passed involuntarily; the tongue and lips were covered with sordes. Diarrhœa became bad, and on the following day she sank and died.

Post-mortem Examination.—Cranium: The cerebral membranes were quite healthy, as also the surface of the brain. In the middle of the left cerebral hemisphere was a small cavity of about the size of a pea, filled with purulent fluid and broken-down brain-matter. The walls of the cavity were soft and very ragged. The other parts of the brain presented nothing unusual. The organs of the *thorax* and *abdomen* were natural. No history of any pyæmic affection could be traced.

[For the particulars of this case I have to thank Dr. Allbutt, physician to the Leeds Infirmary.][1]

CASE XCV. *Abscess in the* RIGHT *Cerebral Hemisphere. Hemiplegia of the* LEFT *side following an attack of Apoplexy.*—Angus M'D., aged thirty-one, a private soldier, was admitted into hospital July 29th, 1820, labouring under partial hemiplegia of the *left* side, having had an apoplectic attack in December, 1819, and having partly recovered the use of the left arm and leg, which had been quite paralysed. He amended so much as to be able to walk with ease, and was discharged. His intellect was, however, much affected, and he was remarkably indolent. On the 5th of November, 1821, however, he was re-admitted in the same state of mind, except that he was more indolent, his animal functions being, however, pretty natural. On the 13th of November he would not rise from bed, and voided his fæces and urine in bed. His pulse was rather quick and feeble, and on the 21st he was seized with convulsions, resembling a fit of epilepsy, followed by coma, which in a few hours terminated in death.

Post-mortem Examination.—Cranium: The vessels of the dura mater were full, and there was much fluid beneath the arachnoïd membrane, and also more than usual in the ventricles. In the anterior lobe of the *right* cerebral hemisphere, a little above the level of the corpus callosum, was a cavity of irregular form, about one inch long and half an inch wide, with soft, reddish parietes, lined by a membrane, not unlike the dura mater, and containing a quantity of puriform matter. The corpus striatum on the opposite, the *left* side, was of a yellowish hue, and morbidly soft. Otherwise the brain throughout was of firm consistence. *Thorax:* There was about an ounce of serum in the pericardial cavity, and the heart was loaded with fat. In other respects the thoracic organs were quite natural. *Abdomen:* The liver was very small, only weighing 2¼ lbs., but appeared quite natural in character. Other organs presented nothing unusual.

For the details of this case I have to thank Dr. John Davy.

CASE XCVI. *Large Abscess in the* RIGHT *Hemisphere of the Brain, in connexion with Hernia of that Organ through the Cranial Bone. Hemiplegia on the Left Side.*—Charles L., aged thirty-two, was admitted into the hospital in February,

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[1] We have a specimen in our hospital museum, presented by Cæsar Hawkins, Esq. (Series viii. No. 22), of abscess of the superficial part of the brain in connexion with exfoliation of the parietal bone, the result of a burn. Unfortunately, we have no further details of the case.

1832. He lived freely as a servant in tropical parts, but had enjoyed good health (excepting some rheumatism and syphilis) until about two and a half years previously, when during sleep in the sun he experienced great pain in the head, which prevented his working for some days. Some time after he perceived a depression at the upper and posterior part of the right side of the head. This increased, and afterwards was succeeded by a swelling, which developed into a pulsating tumour, which was punctured and otherwise treated. After attaining a certain size it remained the same until eight weeks before admission, when he suddenly had a sharp pain in the head and suffered from giddiness and unconsciousness. After this a fungus protruded at the seat of the tumour; and when he was admitted it was of the size of a walnut, springing from the tumour situated at the upper and posterior part of the right parietal bone. On the upper part, also, of the left parietal bone was a soft elastic depression with ill-defined smooth edges, where pulsation of the brain was perceptible, and close by was another but smaller depression. Ligatures were applied, but the tumour, notwithstanding sloughing, increased, and much pain in the head was experienced. Subsequently numbness of the *right* leg and *left* arm, and dimness of sight, came on, and giddiness on recovery, with tendency to sickness. Partial paralysis of the left side of the face, and much numbness of the left arm, and slight numbness of the left leg supervened. Eventually the whole of the left side of the body was paralysed, and paralysis of the sphincters and dysphagia came on. Coma preceded death in March.[1]

Post-mortem Examination.—Cranium: The fungus growth proved to be a portion of brain which had protruded through a large opening in the skull, which was also much thickened in some parts, and otherwise altered. In the centre of the fungus growth was an opening leading into an abscess of large size in the right hemisphere, extending almost to the lateral ventricle, the contents of which had been discharged during life. Around the abscess and fungus the brain was vascular and altered in colour.[2]

II. PURULENT DEPOSITS IN THE SUBSTANCE OF THE BRAIN IN CONNEXION WITH DISEASES OF THE EAR.

CASE XCVII. *Abscess in the Anterior and Middle Lobes of the* LEFT *Cerebral Hemisphere. Disease of the Inner Ear. Coma before Death.*—Matthew P., aged twenty-eight, who for some years had been subject to occasional purulent discharge from the left ear, was admitted August 24th, 1835, three weeks after a blow on the head from the edge of a door. This accident was followed by intense pain at the seat of the blow, and subsequently over the whole head. In a week's time delirium came on, with frequent attempts at self-destruction. He became comatose August 27th, and in a few hours died. It was stated that when at any time the discharge from the ear ceased to run he was wont to be very deaf.

Post-mortem Examination.—Cranium: The anterior and middle lobes of the left hemisphere of the brain contained a large abscess, the walls of which were in a state approaching to gangrene. This abscess communicated with the cavity of the tympanum through an ulcerated opening in the petrous portion of the temporal bone. The temporal bone around the opening was denuded of dura mater, and was roughened and covered with much new porous osseous tissue.[1]

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[1] This case is given with all details, by Mr. Cæsar Hawkins, in the Trans. of the Royal Med.-Chir. Society, vol. xxxix. p. 289.

[2] For preparations showing the fungus growth and the bone, see Hosp Path. Cat., Series ii. Nos. 41 and 42. In the pathological collection of King's College is also a specimen of hernia cerebri (No. 787) in which an abscess exists in the brain substance, communicating with the lateral ventricle. Trephining had been resorted to. Also in St. Thomas's Hospital Museum, Preparation No. 74 shows hernia of the brain through the right half of the frontal bone, owing to fracture, the brain containing an abscess extending more than an inch into its substance. And in St. Bartholomew's Hospital, Preparation No. 85, Series vi., a large cavity exists in the brain-substance in a case of hernia, after fracture of the frontal bone, which contained purulent fluid.

CASE XCVIII. *Purulent Deposit and Disintegration of the Middle Lobe of the* RIGHT *Cerebral Hemisphere. Diseased Lateral Sinus. Caries of the Internal Ear. Scrofulous Deposits in Lungs. Facial Paralysis. Death caused by Hæmorrhage from the Ear.*—Isaac B., aged twenty-seven, admitted February 26th, 1840, with purulent discharge from the right ear, deafness, and pain in the head, from which symptoms he had suffered for six months. In March the discharge, both from the ear and the Eustachian tubes, became very fœtid and copious, and mixed with blood, and at the end of the month there was paralysis of the right side of the face, and a tendency to stupor. Phthisical symptoms became established, and in June extensive hæmorrhage took place from the ear, and caused death June 7th.

Post-mortem Examination.—Cranium: The upper surface of the right temporal bone was carious and cribriform, and very dark in colour, and the dura mater covering it was only partly adherent, and in places sloughy and absorbed. The posterior surface of the petrous part had a small portion of ivory-like bone attached, and the groove for the lateral sinus was carious. Corresponding to the diseased anterior part of the temporal bone the under surface of the middle lobe of the right cerebral hemisphere was sloughy, and the medullary matter around was softened, and contained a small quantity of foul purulent fluid. The lateral sinus connected with the temporal bone was much inflamed, and almost sloughy, but its coats were entire. Around the carotid artery, where it ascends by the side of the sella turcica, was a small quantity of effused blood. The bony floor of the meatus auditorius of the tympanum was absorbed, and there was a large collection of foul pus in the cavity thus formed, which communicated with the temporo-maxillary joint, the condyle of the jaw being also greatly absorbed. *Thorax:* Old pleuritic adhesions and scrofulous tubercles in the lungs were found. *Abdomen:* Scrofulous tubercles connected with the peritoneum, and adhesions of the bowels, existed.[2]

CASE XCIX. *Abscess in the* LEFT *Cerebral Hemisphere. Disease of the Temporal Bone on the same side.*—John W., aged eight, admitted August 19th, 1846. Excepting a slight purulent discharge from the left ear since he was quite young, he had been in good health up to six weeks previous to admission, at which time he had a convulsive fit, apparently of an epileptic nature, which lasted four hours, and had been preceded by vomiting. In the convulsive attack he was blue in the face, and appeared very drowsy. After recovering from this attack, he remained well for seven days, and then had another attack of convulsions, which lasted twenty-four hours, leaving him insensible, with increase of pain and discharge from the affected ear, and passing evacuations involuntarily. He was described as having been "half silly" since the fit, not crying out for food, but taking it if placed in the mouth, and as having had his left eye much closed ever since. On admission, there was profuse discharge from the ear. There was considerable paralysis of the left upper eyelid; the pupils of both eyes were dilated, and the left one was larger than the right, and almost quite insensible to the effects of light. The mouth was drawn to the left, and the tongue, which was clean, protruded to the right. Pulse 85; bowels regular; skin cool; urine free from albumen. The limbs were all very weak, but he had perfect power over them; and he complained of nothing but twinges of pain in the left ear, and of deafness. Articulation was imperfect. Mercurial ointment was rubbed into the neck, and the hyd. c. cretâ given night and morning. He became dull and drowsy, and then semicomatose, losing power generally over the limbs. Subsequently a convulsive attack came on, attended by coma, and he passed his evacuations under him. Several "fits" followed before death, which occurred August 25th.

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[1] See Hospital Path. Catalogue, Series devoted to Organs of Special Sense.

[2] Ibid.

Post-mortem Examination.—Cranium: Bloodvessels of brain and membranes congested, and cerebral convolutions flattened. The portion of brain corresponding to the squamous part of the *left* temporal bone was of a much lighter colour and more transparent than usual; but the dura mater and arachnoïd membrane were in a natural state. The lateral ventricles of the brain were very much distended with fluid, and the brain generally was very vascular. Occupying the outer part of the *left* cerebral hemisphere, including the greater portion of the middle lobe, was a large abscess, the walls of which were very firm and tough, and about one-quarter of an inch in thickness (see Woodcut, Fig. 6), and lined with a blackish sloughy membrane, containing six ounces of very offensive pus; the surrounding brain was soft and pulpy. This abscess approached quite to the surface of the brain, and was adherent to the dura mater, covering the petrous part of the temporal bone; at this depending portion a small communication existed between the abscess and the internal ear by means of a dark coloured opening through the bone (which was much roughened), and an ulcerated aperture in the dura mater, which was easily removed from the subjacent bone. The cavity of the tympanum was found to be full of pus, and the membrana tympani quite destroyed.[1] (189.)

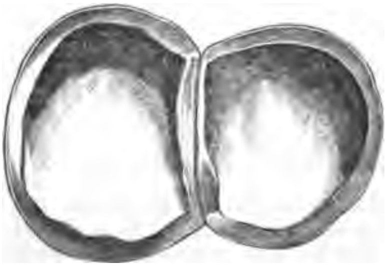

Fig. 6. Dense Walls of an Abscess of the Brain of unusual Thickness.

CASE C. *Abscess in the Middle Lobe of the* RIGHT *Cerebral Hemisphere. Disease of the Right Temporal Bone. Slight Opisthotonos and Coma before Death.*—Charlotte A., aged twenty-six, admitted April 4th, 1849. Six weeks before she had been much subject to boils, which, it was thought, had been repressed by cold. Two weeks before admission, she was seized with pain in, and purulent discharge from, the *right* ear, and three days before she had become delirious. When admitted, she had the appearance of a person labouring under maniacal excitement, and had to be confined in a strait-jacket; she talked wildly, and was alternately laughing and crying, and kicking off the bedclothes, and would not answer questions. The tongue was white and pasty; the bowels confined; the pulse quick and weak; the pupils dilated; the head hot. Ordered one drop of croton oil, a purgative injection, and cold to the head, also ammoniated salines. Subsequently wine was given, and a turpentine injection administered, which brought away lumpy and offensive stools. Urine loaded with lithates. As no improvement was made, she was placed under the influence of calomel. Three days after, a slight attack of opisthotonos came on, the eyes became fixed, the pupils remaining dilated. The urine had to be drawn off by catheter, and was acid. As the gums became decidedly affected by the calomel, it was omitted, but no return of consciousness occurred. She became more quiet, and refused to put out the tongue. The evacuations were all passed involuntarily. On the 16th of April she again became very noisy, and sank into coma and died.

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[1] The diseased temporal bone is described in Hospital Path. Catalogue, in series devoted to Diseases of Organs of Senses; and the Brain, as No. 29, Series viii.

Post-mortem Examination.—Slight bed-sores existed on the shoulders. *Cranium:* The head was rather small, and compressed laterally. The cerebral membranes, specially those on the right side of the brain, were very vascular, and much semi-purulent fluid was contained in the arachnoïd cavity, both on the surface and at the base of the brain. The cerebral convolutions were flattened generally, and the structure of the brain was throughout softened and dripping with serum, containing on section also many puncta. The ventricles contained about six drachms of semi-purulent fluid, and their lining membrane was very vascular. The septum lucidum was quite destroyed, and the posterior crura of the fornix quite diffluent. At the base, the under surface of the middle cerebral lobe of the right side was very vascular (corresponding to the anterior surface of the petrous element of the temporal bone), and of an ashy-grey colour, to the extent of one inch in circumference. On cutting through this part, an abscess of the size of a walnut was found in the centre of this lobe, well defined, and lined by a thick cyst of organized lymph, of a grey colour, and containing an ounce of milk-white pus. The brain-substance around was very vascular and dark, but not perforated, and there was fibrinous exudation between its surface and the bone, which was here slightly ulcerated, having an aperture leading into the tympanic cavity, the interior of which was very ulcerated and full of pus. The membrana tympani was almost entirely destroyed, and the "ossicula" quite so, the surface of the promontory rough and partly absorbed. Other organs of the body were natural, except that the kidneys contained a small amount of purulent fluid in their pelves. (75.)

CASE CI. *Abscess in the* LEFT *Cerebral Hemisphere. Caries of Temporal Bone, and Coagulum in Sinuses. Epileptic Attack followed by Coma.*—James C., aged fifty-one, admitted May 7th, 1851, with cough and pains in the limbs, but chiefly the neck and throat, along with some dysphagia, owing to "cold," as it was thought. The pulse was quick; tongue coated, and there was a pustular eruption on the upper lip, and a general cachectic look. There was also a purulent discharge from the left ear. He so far recovered as to leave the hospital with only a slight head-ache, but still having the discharge from the ear. On the day after going out he was seized with pain all over the body, and also had a "fit," and became quite insensible the following day. He was again admitted into the hospital June 21st, being in a slight degree only conscious. He spoke but slowly and incoherently, and was depressed in mind. The tongue was coated; the pulse fuller. He slept much, and gradually became confused, but not delirious or noisy. Under the use of blisters behind the ear the discharge nearly ceased. The urine passed involuntarily, and he gradually sank and died June 29th.

Post-mortem Examination.—*Cranium:* The dura mater was firmly attached to the skull, and the Pacchionian bodies were large. Where covering the middle and anterior part of the left temporal bone the dura mater was ulcerated through to the size of a fourpenny-bit; the aperture having dark edges corresponded to a carious opening in the temporal bone; moreover, the bony parietes of the left lateral sinus, as regards the petrous part of the temporal bone, and also the external auditory meatus, were in a carious state. The cranial bones generally were thin and soft. On examining the brain itself, the pia mater covering the upper parts of both cerebral hemispheres was so highly injected, as to look as if blood had been ecchymosed. The whole of the brain was much softened, but especially the entire *left* cerebral hemisphere, which was adherent to the left temporal bone; in this hemisphere was a collection of pus of some size, contained in a firm, distinct capsule. The ventricles contained a quantity of shreddy purulent fluid; their septum was broken down. The left lobe of the cerebellum, though otherwise natural, was compressed and flattened as if by enlargement of the cerebral hemisphere. A quantity of light-coloured fibrinous coagulum was found in the sinuses and veins about the left petrous bone. The arteries at the base of the brain were atheromatous, but nothing more. *Thorax:* The right ventricle of the heart was very attenuated. A thin film of fibrin was found coating the aortic valve-flaps. The lungs were gorged and, to a certain extent, consolidated.[1] (139.)

CASE CII. *Abscess in the* RIGHT *Cerebral Hemisphere. Disease of the Ear following Scarlet Fever. Epileptic Attacks. Fibrin Coagulum in Lateral Sinus.*—Caroline B., aged twenty-three, admitted January 22nd, 1857. She had been subject to leucorrhœa for some weeks, and to much head-ache for two weeks before admission. It was stated that she had had scarlet fever when a child, and had "seen double" ever since at times, and had a discharge from the right ear. She had also had head-ache at times ever since she was a child. Her temper was naturally irritable. On admission she was rambling in mind, and not quite sensible when spoken to. She complained of much pain at the back of the head, and especially in the neighbourhood of the right ear, from which much thinnish, red discharge escaped. She was quite deaf with this ear. The pulse was quick but soft; thirst was much complained of. She had never had any rigors. Ordered salines and aperients, and counter-irritation to the mastoïd region. After a few hours a series of epileptic attacks came on, during which the mouth was drawn to the left; and at times she was almost black in the face, foaming at the mouth, and clenching the hands. She also screamed much, and was quite insensible. Other fits succeeded after an interval of a day, and she was salivated by the use of mercury. The pupils remained natural, and also the muscles of the face and eyeballs until the 30th, when slight convergent strabismus of the left eye was observed; still the pupils were equal and active. She complained of great pain in the head, and of feeling, as she said, "as if the eyes were shooting out." Subsequently much pain down the back and in the cardiac region was experienced. There was then much expectoration, but the soreness and painfulness of the surface was so great, that auscultation could not be had recourse to. Later on, high fever existing, the muscles on the right side of the face were noticed as certainly weakened in action. After a time, intense agony and screaming came on; but she remained quite sensible even until her death, which occurred, without the supervention of further convulsions, February 6th.

Post-mortem Examination.—Cranium: Much pus was found in the areolar tissue of the scalp, and beneath the pericranium of the right temporal bone; and the corresponding part of the cranial parietes was very dark in colour, and its diploë was full of pus. Purulent matter was also found between the dura mater and the part of the cranial bones forming the middle and posterior cerebral fossæ, the dura mater itself being, to a considerable degree, in a sloughy condition. Covering the cerebral convolutions in the above-named fossæ on the right hand was a quantity of recently-formed fibrin; and in the substance of the brain, at this part, was an abscess of the size of a walnut; the surrounding brain-substance being soft and vascular. The right lobe of the cerebellum was covered by recently-formed fibrin. Moreover, in the left lateral sinus was a firm coagulum of fibrin and blood.[1] (32.)

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[1] Preparation of Diseased Brain in Hosp. Path. Cat., Series ix. No. 30.

CASE CIII. *Abscess in the* RIGHT *Cerebral Hemisphere. Disease of the Right Ear. Convulsions and Coma before Death.*—Charlotte W., aged fifteen, a strumous-looking girl, had for many years been subject to a profuse discharge from the right ear, which occasionally diminished in quantity, *whenever a wound which she had on the right foot discharged.* On the 7th of July, 1859 (the previous day having been very hot, and one of great excitement and fatigue), she had loss of appetite; and, on the 8th, vomiting and pain in the head came on, for which an aperient was given, which opened the bowels freely. On the 9th, when visited, the vomiting had increased, the tongue was covered with a yellowish fur, the pulse was small and weak, and frequent, and much head-ache at the lower and back part was complained of. Ammonia was given in effervescing salines, but on the 10th the sickness had much increased and the patient was weaker. In the afternoon of that day convulsions came on, and shortly afterwards she lapsed into a semi-comatose state, from which she could only be occasionally roused so as to answer questions. There was also stertorous breathing with strabismus. In spite of counter-irritation and other remedies she sank and died in the evening.

Unfortunately, no *Post-mortem Examination* could be obtained, and it was impossible, therefore, to say positively what condition the brain was in, though it may be considered most likely that some cerebral abscess had been formed in connexion with disease of the internal ear. For the details of this case, I have to thank my friend, the late Francis T. White, Esq., formerly a student at St. George's Hospital.

CASE CIV. *Abscess in the Middle Lobe of the* RIGHT *Cerebral Hemisphere. Disease of the Temporal Bone.*—Henry S., aged fifty-four, a wine-cooper, and utterly destitute, was admitted January 9th, 1861. Six months previously he had had a "fit," after eating a large meal, but there were no convulsive movements, and he soon recovered to some extent, though his mind remained affected, and he had attempted suicide. Frequently he had pains in the forehead, but never experienced any loss of muscular power in any part. On admission he appeared stupefied, but soon became quite conscious; there were no indications of paralysis or distortion of features, but he had much pain in the head. There was purulent discharge from the right ear. He was purged, and blistered on the neck. Two days afterwards he had a "fit," in which he was quite unconscious, the limbs all the while being lax and powerless. The entire body was without sensibility, and no reflex action of the eyelids could be produced. The breathing was quiet; pulse feeble—54 per minute. The left pupil was unusually contracted, though sensitive to light; the right one was dilated and fixed. He remained in the same comatose state until stertor came on. He died in a convulsive attack June 22nd.

Post-mortem Examination.—Cranium: The dura mater was very adherent to the calvarium, and all the cerebral membranes were united and matted together, and adherent to the petrous portion of the right temporal bone, which was necrosed so extensively, that a portion of about the size of a fourpenny-piece was quite loosened by ulceration, and, by a little force, could be removed. The bones of the tympanum and its "membrane" were destroyed, and the auditory meatus was filled with inspissated discharge. The lateral ventricles were natural, and contained clear serum, but a very large abscess was found in the substance of the brain external to the ventricle, and occupying the whole of the middle lobe of the right hemisphere down to the base of the brain, where the membranes were united together as before described. The other organs of the body were not examined. (20.)

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[1] I have notes of a case (Edward K., aged thirteen) which occurred in our hospital in 1853, in which there was extensive disease of the ear, and, from the symptoms, supposed abscess of the brain. The patient went out relieved, but on one occasion suffered severely from an attack of sudden dyspnœa, for which no cause in the lungs or heart could be traced.

CASE CV. *Abscess of the* LEFT *Cerebellar Hemisphere. Disease of the Left Ear. Convulsions before Death.*—Jessie R., aged seven, admitted as an out-patient under my care in October, 1863, with great debility, enlarged cervical glands, and discharge from the *left* ear. She had had scarlet fever two years previously, and for four months the fœtid discharge from the ear had been noticed, though it was not constant. She had latterly been subject to great pain in the ear and head. There had been no convulsive attacks. When admitted as in-patient, November 4th, there was complete absence from fever. Under the use of tonics, daily syringing the ear, &c., she much improved, and the pain almost quite ceased, except when the syringing was performed. On the 22nd, shortly after the ear had been syringed, she had a "fit," the limbs being much stiffened, and the head drawn back, and she subsequently vomited a little. When seen on the 23rd she was lying with the head thrown back, the eyes moving restlessly under their closed lids. She complained of pain in the forehead, and the pulse was 100 and irregular. The pupils were large, but equal in size, and acting to light. Although the child continued to recognise people about her, the convulsive attacks persisted. She screamed greatly, but never wandered in mind. The fits continued, in spite of blistering and purgatives, until she died on the 26th.

Post-mortem Examination.—Cranium: Surface of the brain generally much flattened, and veins much distended; substance of the brain unusually dark. Much clear fluid existed in the lateral ventricles, and the septum lucidum was rather softened. The upper part of the left lobe of the cerebellum contained a quantity (about half an ounce) of greenish pus, in an irregularly-shaped cavity, which extended beyond the median line, and communicated with the surface by means of a small orifice corresponding to the internal auditory foramen of the left temporal bone, which was found to contain a quantity of concentrated pus. The surface of the temporal bone was quite natural. The membrana tympani was absent, and the bony sides of the external auditory foramen, which contained pus, were exposed but not softened. Other organs not examined. (284.)

CASE CVI. *Abscess in the Middle Lobe of the* RIGHT *Cerebral Hemisphere, as also in the* RIGHT *Lobe of the Cerebellum. Disease of the Temporal Bone. Thrombosis of the Lateral Sinus. Coma before Death.*—Thomas C., aged twenty-two, admitted April 25th, 1864, with sore throat of a week's standing, and extreme difficulty in swallowing. On admission, there was discharge from the right ear, and great swelling, but no ulceration, of the parts at the back of the throat; also very offensive breath and foul tongue. He improved under port wine, with salines and diaphoretics, and the discharge from the ear ceased rather suddenly; shortly afterwards severe rigors with collapse supervened, but he recovered under stimulants. Two days later severe pain at the right side, and hurried breathing came on. He became stupid and heavy, gradually fell into a comatose state, and died on the 6th of May.

Post-mortem Examination.—Cranium: The cerebral membranes and brain itself were very full of blood. Ulceration of the dura mater over the anterior surface of the petrous portion of the right temporal bone existed; and this membrane around was separated from the bone by pus, which was traced to the lateral sinus, the whole of which, as also of the internal jugular vein to some extent, was full of pus and shreddy fibrin: the osseous wall of the sinus to some extent was carious. The right hemisphere of the brain was adherent to the dura mater, around the ulcerated opening above described, and its middle lobe was found to contain a quantity of purulent matter of the size of a hen's egg. The right lobe of the cerebellum contained an abscess as large as a walnut, occupying the upper and anterior part of the lobe, with a small superficial orifice attached to the dura mater as in the case of the other abscess. *Temporal bone:* The cranial aspect of the temporal bone was natural, excepting a part of the groove for the lateral sinus with which the pus had been in contact, and this was slightly eroded. The membrana tympani was absent, and a probe passed down the external auditory meatus, which was bathed in pus and deprived of mucous membrane, came upon exposed bone, but no positive caries was found. *Thorax:* Numbers of fœtid abscesses existed in both lungs, and the surface of the right one was coated by soft fibrin. Other organs natural.[1] (117.)

III. CARCINOMATOUS GROWTHS.

As I have very recently given the details of such cases as appeared to be instances of carcinomatous disease of the brain of a "Primary" character in the 'Journal of Mental Science,' July 30th, 1864, I shall not repeat them in this series. These I shall merely enumerate along with others in chronological order, indicating such by suffixing the initials J. M. S. for the sake of identification.

There are some cases which I have hardly known whether to classify as carcinomatous or innocent; I have, however, arranged them among the fibro-nucleated, to be described later on, and in so doing have been more influenced by probabilities than by any absolutely certain knowledge of their character.

CASE CVII. *Carcinomatous Tumour, pressing on the* RIGHT *Side of the Medulla Oblongata. Remains of old Extravasation of Blood in the Left Optic Thalamus and Corpus Striatum. Hemiplegia on the Right Side.* (1841. 66.) (J. M. S., No. 11.)

CASE CVIII. *Carcinomatous Tumour of the Falx Cerebri. Pressure upon and Softening of the Brain. Similar growths in the Mediastinum and Abdomen.*—James T., aged fifty-three, admitted December 21st, 1840, and died January 3rd, 1841.

Post-mortem Examination.—Cranium: Pressing upon the upper and inner part of the left cerebral hemisphere, near the middle of the falx cerebri, was a carcinomatous tumour of the size of a walnut, the brain around being softened. *Thorax:* A large cancerous mass existed in the anterior mediastinum, and the lungs were hepatized. *Abdomen:* Mass of cancerous substance (size of fœtus' head) on either side of the spinal column, and behind the peritoneum. In parts of this deposit numbers of cysts existed, some with puriform contents. (6.)

CASE CIX.—*Carcinomatous Tumour connected with the Cerebral Membranes imbedded in both Anterior Cerebral Lobes. Softening of the Right Corpus Striatum. Scrofulous Tumour in centre of Pons Varolii.*—Henry H., aged thirty-seven, had been out of health for a year, and for four months had had numbness in the *right* thigh and leg, and for one month much pain in the shoulders, left arm, and right leg. He had a fall on the head, by which he was stunned, on the 3rd of September, 1862, and was admitted into the hospital on the 7th. At that time he had quite lost the use of the left hand, owing, as he supposed, to the fall, and he suffered from difficulty in voiding the bladder (not owing to any stricture). Under the use of iodide of potassium, sedatives and aperients, and warm baths, the pains became diminished; but on the 16th the urine and fæces passed involuntarily. Sensibility of the skin was not affected, but bed-sores formed. Later on all pain was gone, but he was much troubled with constipation. The bed-sores almost healed, but formed again, and the pain returned. On the 23rd the speech was observed to be embarrassed, the pulse rapid, and the tongue red, and his memory was held to be "very shallow." In spite of wine and nourishment, and caustic irritation behind the ears, the articulation became more indistinct. On the 1st of December his face became of a yellowish pale colour, and he died in the evening.

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[1] This case has been related at length by Dr. Dickinson in the Trans. of the London Path. Society, vol. xv. p. 24.

Post-mortem Examination.—Thorax: Vomicæ existed in the lungs; there were also pleural and partial pericardiac adhesions. *Abdomen:* The liver was granular, the kidneys congested; calcareous deposits existed in the mesenteric glands. *Cranium:* The veins of the brain were very full of blood. The anterior parts of the *right* corpus striatum was of a grumous consistency and quite diffluent; the left corpus striatum was natural. At the under surface of the anterior lobes, and partly imbedded in their substance, was a tumour of the size of a walnut, situated immediately behind the crista galli, the parietal arachnoïd covering the part being unaffected. When divided, the tumour was quite firm and vascular, and in some parts of it blood had been extravasated. It was surrounded by a vascular cyst, partially adherent to the pia mater and arachnoïd; its connexions with the brain were readily destroyed. In the centre of the pons Varolii was another tumour of the size of a large hazel-nut, which, when cut into, resembled the common scrofulous tubercle. This was surrounded by a vascular membrane, but no vessels could be traced into the substance. Other parts of the brain were natural. (83.)

This case I described in the 'Journal of Mental Science' as No. 13, but was not then able to give the life-symptoms. I am able now to do so by the kindness of Dr. Wilson, lately our senior physician at St. George's Hospital.

Case CX. *Carcinoma of both Hemispheres of the Brain. Carcinoma of the Left Eyeball.*—Charlotte M., aged sixteen, was admitted into St. George's Hospital December 8th, 1841, owing to "fungus hæmatodes" of the left eyeball. The organ was extirpated,[1] and the patient left the hospital relieved, but returned April 3rd, 1842, complaining of pain in the head, and of loss of vision in the right eye; vomiting, at first after meals, but subsequently at other times also, came on, which, along with the pain in the head, increased until she died, June 9th.

Post-mortem Examination.—Cranium: The posterior part of the anterior lobes of the brain, and also the structures behind, as far back as the fore part of the pons Varolii, were occupied by encephaloïd carcinomatous deposit. The growth, which was very soft in character, was intimately connected with the left optic nerve. The right optic nerve was much flattened and displaced by the tumour, down the side of which, and winding round the crus cerebri, it could be traced. Cerebral congestion and slight serous effusion into the lateral ventricles existed.

Microscopical Examination.—The growth was found to have the following appearances: it consisted entirely of cells, no fibres being seen; and the cells were some of an oval shape, some round, and some triangular. Many of the oval ones had nuclei, and a few had slight elongations from their extremities, but there were no traces of decided fibres. Many round ones also had nuclei, and some were very large, with granular or highly refracting clear contents. Moreover, some cells were simple nuclear bodies, rendered clear by the addition of acetic acid.[1]

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[1] The eye will be found described in Hospital Path. Catalogue, in the series devoted to diseases of that organ.

CASE CXI. *Carcinomatous Tumour in the Posterior Lobe of the* LEFT *Cerebral Hemisphere. Pressure on the Optic Tracts by a very peculiar Protrusion of Brain-substance. Paralysis of Optic Nerves.* (J. M. S., 12.) (1843, No. 49.)

CASE CXII. *Encephaloïd Carcinomatous Growth in the Middle of the* RIGHT *Cerebral Hemisphere. Other Organs natural.*—Martha P., aged fifty, a married woman, was admitted November 15th, 1843. She said that she had had darting pains in the head for some years, which gradually got worse. She frequently suffered from giddiness, and was "benumbed." The memory was impaired, and she had had a fit three months previously, after which she was unconscious for a day, and lost power of speech for twenty-four hours. On recovering therefrom the left arm and leg proved quite powerless. She was bled three or four times, and blistered. The catamenia had been regular until three months previously. On admission the arm and leg had regained power considerably, but not entirely by any means. The pulse was quick and weak, the tongue furred and moist. The compound decoction of aloes and ammonia were ordered every night, and the nitrate of potash and spirit of nitric ether thrice a day. On the 20th, she was noticed as being dull and stupid, and the evacuations were passed involuntarily. Purgatives, and blistering behind the ears, were resorted to. After varying much as regards dulness or liveliness of manner, the *right* arm began to fail in power, the tongue to become dry and brown, and pain was complained of in the right hypochondriac region. The pupils, which had been rather inactive, became contracted and quite fixed. Perspiration was excessive, and the pulse became small and weak. Semi-coma and difficulty in swallowing came on; from this she roused, and was able to speak and complain of pain in the *right* side of the head. Under the use of counter-irritation and small doses of grey powder she rallied much, but could not articulate at all distinctly. On the 8th of December she became quite unconscious; dysphagia was very great, the perspiration profuse, and pupils very contracted. Coma became complete; the respiration became hurried, and lividity of the face preceded death on the 10th.

Post-mortem Examination.—Thorax and Abdomen: Organs congested, but otherwise quite natural. *Cranium:* The skull was natural. The cerebral membranes were so adherent to the brain that they were with difficulty separated; the cerebral convolutions were much flattened. In the middle and posterior parts of the white substance of the *right* cerebral hemisphere was a deposit of encephaloïd carcinoma, of the size of a small orange, sufficiently well-defined in some parts, but in others gradually assuming the appearance of the surrounding brain substance. Section of the tumour showed a light yellow material, covered by a glairy transparent fluid, discoloured in various situations by extravasations of blood, which varied in size from that of an ordinary leaden "shot" to that of a bean. The right lateral ventricle was distended by clear fluid. (251).

This case was related as No. 14 in the series of Primary Cancer of the Brain, in the 'Journal of Mental Science,' but I produce it here in full, inasmuch as I am now enabled, which I was not when I described it in that journal, to give the life history, owing to the kindness of Dr. Nairne, under whose care the case was.

CASE CXIII. *Carcinoma of the* LEFT *Cerebral Hemisphere. Intense Pain in the Head and Vomiting.*—William N., aged forty-three, admitted Oct. 25th, 1843, having had two epileptic attacks, since which the functions of the brain had been much impaired. Had been worse for one month previously, and was unable to sit up in bed without great pain; pulse 89; bowels open; pain in the head was great on admission. Was blistered at the neck, and bled to 12 ounces, and had the bichloride of mercury (gr. ¼) given, with the same amount of opium twice a day. Later on constant vomiting came on; and the pain still remaining, he was again leeched and blistered, and had the cantharides and purgatives administered. He died Nov. 10th.

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[1] For preparation of this tumour, see Hospital Path. Catalogue, Series viii. No 44.

Post-mortem Examination.—Cranium: The skull and cerebral membranes were natural, except that the latter at the posterior part of the longitudinal sinus contained a layer of bony deposit; the lateral ventricles of the brain were enlarged, and the whole of the LEFT hemisphere at the posterior part was occupied by a carcinomatous (encephaloïd) mass. *Thorax and Abdomen:* The left lung was consolidated by the same deposit; the epididymis of both testicles contained similar deposits. (226.)

CASE CXIV. *Encephaloïd Carcinoma of the Middle Lobe of the Right Cerebral Hemisphere, containing Extravasated Blood. Softened Brain. Coma, and remarkably Slow Pulse before Death.* (J. M. S., No. 1.) (1844, 210.)

CASE CXV. *Large Fungoïd Carcinomatous Growth in the Left Cerebral Hemisphere. Brain Softened. Difficulty in Speech. Loss of Memory.* (J. M. S., No. 2.) (1845, 32.)

CASE CXVI. *Fungoïd Carcinomatous Growth in the Right Cerebral Hemisphere. Loss of Memory. Apoplexy. Partial Hemiplegia on Left Side.* (J. M. S., No. 3.) (1846, 65.)

CASE CXVII. *Fungoïd Carcinomatous Growth in the Right Cerebral Hemisphere. Softened Brain around. Partial Hemiplegia of Left Side.* (J. M. S., No. 4.) (1846, 20.)

CASE CXVIII. *Carcinoma of the* RIGHT *Optic Thalamus. Hemiplegia on the Opposite Side of the Body.*—Henry C., aged forty-eight, admitted December 6th, 1849. Whilst at work in the forenoon, and alone, he was suddenly seized with loss of power and of sensation coming on in the LEFT arm, and quickly depriving him of the use of his leg also. It was some time before assistance came, but he was certain that during that time there was no loss of consciousness. He managed to crawl to the door of the shop and call for aid. At first the paralysis was complete, but on admission there was some degree of power, *although total anæsthesia continued.* He said that his speech was also affected at first, but there was no paralysis of any muscles of the face or of the tongue. The pupils were *contracted.* Had had occasional pain in the head since his seizure, but had none on admission. Tongue furred; pulse full, quiet; bowels open. Had been treated, but not bled. He was cupped on the temples to five ounces, and took the dec. aloes c. ℥ss., with mist. camph. ℥i. b.d., and the hyd. c. cretâ gr. vi. o. n. He became salivated on the 11th, having taken five doses of grey powder, when he had gained considerably in power of motion, both in the arm and leg, and also some degree of sensation. He was going on well, but continued very weak, and on the 30th, when he got out of bed, it was first found that the skin of his back was abraded. The salivation had continued more or less, and the motion of the arm and leg was much improved. He was put on tonics and wine, but got weaker. Severe *hiccough* came on, and lasted two or three days. Afterwards great difficulty, and sighing inspiration, and moaning came on. The back continued very sore, and he sank and died January 10th.

Post-mortem Examination.—Body in good condition, and well made. Slight fluid under the arachnoïd membrane, and pia mater slightly congested. Substance of cerebral hemispheres healthy, but lateral ventricles much distended with clear fluid. That part of the RIGHT *optic thalamus* forming the upper part of the lateral boundary of the third ventricle presented a slight eminence less marked on the surface of the thalamus of the opposite side. When this was cut into, a small tumour was found in the centre of the thalamus, of the size of a pea, very soft, and of a dark brown colour, which proved to be of a carcinomatous character, the structure being broken down, and blood having been effused into its substance. Nothing more was found worthy of remark in the cranium. *Thorax:* Organs natural. *Abdomen:* A large encephaloïd tumour existed in the right kidney, of the size of an orange, and a smaller one in the left kidney; the kidneys were also otherwise diseased. Other organs healthy. (11.)

CASE CXIX. *Carcinomatous (Encephaloïd) Mass connected with the Cerebral Dura Mater at the Edge of the Foramen Magnum.*—Jane B., aged forty-nine, was admitted into our Hospital Dec. 19th, 1849. She had some time before had a fit of some kind or other, and for some time afterwards was in a state of unconsciousness. Subsequently she lost the power of movement on the *left* side of the face. From this want of power she had partially recovered, but latterly the *right* side of the body had fallen into a similar state. On admission she could neither stand, walk, nor feed herself without assistance; she could, however, move both of her legs when in bed, although slowly; and the left arm and leg could be much more easily moved than those on the right side. She had been frequently subject to sensations of numbness over the entire body, but she had never experienced actual pain or had any convulsive attack. There was complete absence of anæsthesia as regards pinching or pricking of any part of the skin. Whilst in the hospital she was unable to draw up the legs simultaneously, but she could pull them up one after another. Muscular power diminished, and she gradually sank and died 8th January, 1850, with dyspnœa, cough, and secretion into the bronchial tubes.

Post-mortem Examination.—Thorax: The lungs were much congested. *Cranium:* A vascular but very firm encephaloïd tumour of the size of a small walnut was found attached to the dura mater, connected with the right and anterior border of the foramen magnum. This tumour indented the cerebellum and encroached greatly on the foramen magnum, the parts which passed through having hooked around it, moreover, the seventh and eighth pair of cranial nerves. A small mass of a similar character was also found attached to the dura mater at the opposite (the anterior) border of the foramen magnum; and there the encephaloïd growths interfered to such a degree with the aperture for the passage of the spinal cord as to reduce it to a triangular-shaped space, so small as barely to allow the tip of the little finger to enter.[1] Two other and like growths were found to be connected with the falx cerebri, and the dura mater near the optic commissure. *Spinal Cord:* The dorsal part of the cord was somewhat softened. (10.)

CASE CXX. *Encephaloïd Carcinoma of the* LEFT *Optic Thalamus. Partial Loss of Power in all the Limbs, especially on the Right Side. Convulsions. Partial Loss of Sight.* (J. M. S., No. 5.) (1850, 157.)

CASE CXXI. *Encephaloïd Carcinoma of the Dura Mater and Skull, forming a Tumour External to the Cranium. Similar Growths in the Abdominal Organs.*—Anne B., aged thirty, having been previously in good health, was confined of a child a year and a half before death. After that event she experienced pain at the abdomen, left groin and hip, and the left leg became paralysed. She also had much pain in emptying the bladder. When admitted into the hospital, January 3rd, 1852, she was in a very depressed state of mind, and, in addition to the above symptoms, was suffering from those of inflammation of the bladder. A distinct tumour was found within the pelvic cavity, on examination *per vaginam*, but apparently unconnected with the bladder. A fluctuating tumour was also noticed at the back of the right side of the head, which quickly increased in size. In spite of stimulants and narcotics, the patient sank and died in about ten days after admission.

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[1] See Hospital Path. Cat., Series viii. No. 84; also Brit. and For. Med.-Chir. Review, Oct. 1859, p. 503, where the case is detailed in connexion with observations on Dr. Brown-Séquard's views.

Post-mortem Examination.—Cranium: The tumour on the right side of the head was found to be an encephaloïd carcinomatous growth, which had made its way from the cavity of the cranium through the suture between the parietal and the occipital bones, and was connected with the corresponding part of the dura mater. The outer surface of the cranial bones (which here were dense, thickened, and vascular), at the part where the growth existed, was carious, and deprived of pericranium. The inner surface of the dura mater, corresponding to the growth before mentioned, presented a small lump of a similar kind, but had an entirely even surface. The subjacent arachnoïd membrane was unaffected, as was also the structure of the brain, which was, however, depressed by the morbid mass connected with the dura mater, and from this pressure the cavity of the right ventricle was almost quite destroyed. Moreover, on the left side of the head a small mass of carcinomatous growth was found connected with the external surface of the dura mater, but it had not penetrated either the bone or the brain. *Thorax* and *Abdomen:* Encephaloïd growths were also found in the pleura, kidney, and pancreas, and in the pelvic cavity was a large mass connected with the inner surface of the sacrum on the left side and with the contiguous ilium, having made its way through the sacro-ischiatic synchondrosis, and become connected with the posterior surface of the sacrum, rising up among the muscles of the back.[1] (13.)

CASE CXXII. *Carcinoma of the Inner Table of the Frontal Bone; also of the Liver and Spleen.*—John L., aged twenty, was admitted September 6th, 1853, in an exhausted, anæmic, and emaciated state. He acknowledged to having been given up to masturbation since a boy. He complained of pain all over, especially in the back, hips, and knees. In spite of cod-liver oil, tonics, &c., he gradually lost what little strength he had, and sank and died Sept. 30th.

Post-mortem Examination.—Cranium: Two small encephaloïd carcinomatous masses were found imbedded in the substance of the inner table of the left side of the frontal bone, but they were not adherent to the dura mater. The brain was healthy. *Thorax:* Lungs œdematous. *Abdomen:* Encephaloïd masses were found in the spleen and liver. Other organs of body healthy. (200.)

CASE CXXIII. *Carcinoma of the* RIGHT *Cerebral Hemisphere. Double Vision. Convulsions. Numbness of the Left Arm and Right Leg.* (J. M. S., No. 6.) (1845, 172.)

CASE CXXIV. *Carcinoma of the Cranial Bones and Cerebral Dura Mater, indenting the* RIGHT *Lobe of the Cerebellum. Also, of the Lumbar and Dorsal Vertebræ, and numerous Viscera. Paraplegia.*—Elizabeth L., aged twenty-six, admitted 10th Oct., 1855, having enjoyed good health until about four months before, when the urine became tinged with blood, owing, as she thought, to a strain. At that time she experienced no pain, but two months before admission she had great pain in the loins, which had persisted. On admission the pain in the loins was considerable, the tongue was coated, and the bowels confined. The catamenia were regular, the urine dark, and containing blood and pus. For a time cupping to the loins and aperients gave relief, but afterwards pain in all the limbs came on, unrelieved by morphia. After being in the hospital about three weeks loss of power came on in the legs, and this became complete; the urine became ammoniacal, and passed involuntarily. Hectic came on, and she died about one month after admission.

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[1] See Trans. of Path. Society, vol. iii. p. 226; also Hospital Path. Catalogue, Series viii. No. 85, and Series ii. No. 228.

Post-mortem Examination.—Cranium : The cranial bones exhibited several traces of carcinomatous material both on their outer and inner surfaces; the surrounding bone was very vascular, and similar material existed in the diploë and its veins, and in the vessels (enlarged) between the diploë and the surface. The cerebral dura mater was in several places the seat, on its outer surface, of shreddy carcinomatous material, which did not affect the brain except in the case of the right lobe of the cerebellum, which was indented on its surface by the growth. On the left side the carcinomatous mass penetrated the dura mater, and found its way into the lateral sinus, presenting a shreddy mass therein. *Spine :* The bodies of all the lumbar vertebræ were much softened and much occupied by carcinomatous material, the last two being almost quite destroyed by it. The growth encroached upon the spinal foramen, pressing much upon the nerves, and upon the spinal dura mater, to which it was firmly adherent, without, however, penetrating it. Several dorsal vertebræ were also affected by the growth. *Thorax and Abdomen :* The lungs, liver, kidneys, abdominal lymphatic glands, and bladder were also affected by the morbid growth.

Microscopical Examination : The various carcinomatous masses in all parts showed the presence of almost entirely round cell-bodies, containing in some cases granular matter, but in most only clear fluid; the majority being a little larger than pus-globules, and some twice the size. This became granular after slight soaking in spirit and water. A few only very large nucleated cells were seen. Similar cell-forms were met with in the veins of the diploë, *and in the clot of the lateral sinus affected.*[1] (291.)

CASE CXXV. *Carcinoma of the Dura Mater, of the Lining of the* RIGHT *Lateral Ventricle, of the 7th and 9th Cranial Nerves, and various Viscera. Proptosis. Epilepsy.*—James H., aged twenty-seven, admitted Feb. 20th, 1856, with great protrusion of both eyeballs, especially of the left one, of which he was quite blind: but he was said always to have been remarkable for having a full eye. A firm substance could be felt over the left eyeball, within the orbit. He had also a tumour over the region of one of the scapulæ, and several small, hard, but moveable tumours beneath the skin, in various parts, which he said he had had as long as he could remember. He had had much pain in the head for three months, for which period the eyeballs had been greatly projecting, as the patient thought. He became the subject of epileptic attacks, got weaker, and died about ten days after admission.

Post-mortem Examination.—Cranium : The under surface of the dura mater at about the middle of the skull, and near to the longitudinal sinus, had a greyish brown mass of about the size of a shilling, and a quarter of an inch in thickness, intimately connected with it, and uniting it to the arachnoïd membrane, and cerebral convolutions (which were unaffected) beneath. A similar deposit, of about the size of two peas, was found in connexion with the lining of the right lateral ventricle covering the lower part of the anterior portion of the septum of the cavity (see Woodcut No. 7). Moreover, a quantity of black deposit was found amidst the nervous fibres composing the seventh and ninth pairs of cranial nerves on each side, passing into them with their respective auditory and jugular openings. Deposits of encephaloïd and melanotic material were found also within the orbit,[1] in the heart, spleen, kidneys, omentum, and other parts, and occupying most of the lymphatic glands.

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[1] See also Trans. of Path. Soc., 1855-56, p. 383, where a lithographic illustration of the histology of the morbid growth will be found.

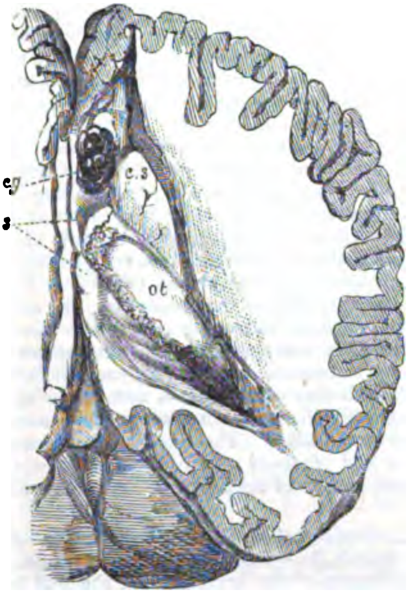

Fig. 7.

s. Septum of the ventricles.
c g. Carcinomatous growth connected therewith.
c s. Corpus striatum. *o t*. Optic thalamus.

Microscopical Examination.—The morbid growths presented much amorphous and fibrous stroma, with numbers of rounded and oval cells (at times irregular and angular in shape), rather larger than pus-globules, containing granular matter, and, in places, large oval nuclei discoverable on the addition of acetic acid. In places also numbers of fat-globules existed. In many cases the above cells contained a brown material, rendering them opaque. No caudate, or fusiform, or concentrically-marked cells were found. The cells were not arranged in any special manner. In one or two places only a few cells might be seen prolonged slightly into a fibre. Large bloodvessels were met with in one or two parts.[2] (100.)

CASE CXXVI. *Carcinoma (Encephaloïd and so-called Melanotic Forms) of the* LEFT *Cerebral Hemisphere; also of the Heart, Kidney, Pancreas, &c. Hemiplegia on the* RIGHT *side. Increased and peculiar Movements of Paralysed parts.*

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[1] In King's College, Preparation 806.2 shows a very large fungoïd carcinomatous growth in the lachrymal gland, removed from a child who was only *one month old* at the time of death.

[2] For full particulars see Trans. of Path. Society, vol. vii. p. 5; also Hosp. Mus. Catalogue, Series ix. No. 86. In the St. Bartholomew's Hospital Museum, No. 51, Series vi., shows a medullary growth *occupying the interior of the lateral ventricles.*

—George K., aged thirty-five, admitted July 14th, 1856, who had twice undergone operations for the removal of tumours from the surface of the body. When admitted, the lymphatic glands in the axillæ, popliteal spaces, and under the skin, in many parts, were greatly enlarged, and he had diminished power of movement in the *right* leg, and complete loss of power in the *right* arm; and the sensibility of the skin over the whole of the right side of the body was greatly diminished. The temperature of the right arm was much higher than that of the left, and the patient affirmed that ever since he had been ill there had been increased heat of that side of the body. *The paralysed hand would also clench firmly whenever the patient yawned.* The muscles on the right side of the face were partially paralysed. There had been "double vision" and vomiting. The speech was slow; vomiting became troublesome; ptosis of the left upper eyelid came on, and on the next day he became livid, vomited much, and died, as if from strangulation, July 27th.

Post-mortem Examination.—Carcinomatous, encephaloïd and melanotic masses were found in the left cerebral hemisphere. One, of the size of a bantam's egg, occupied the anterior extremity of the hemisphere; the other, of the same size, was situated at the posterior and upper part of the hemisphere. The brain-substance around these masses was somewhat softened, and the dura mater and arachnoïd membrane corresponding were thickened and adherent.

Microscopical Examination.—The masses were made up of round and oval and elongated nucleated cells, containing, where the masses were dark-coloured, more or less pigmentary matter. The remains of extravasated blood were also met with. *Thorax* and *Abdomen:* Similar carcinomatous masses were found in the throat, on the surface of the lungs, in the kidneys and pancreas.[1] (178.)

CASE CXXVII. *Carcinomatous Masses in both Cerebral Hemispheres. Also in the Liver, Lumbar Glands, &c.*—Sarah M., aged thirty-three, admitted July 15th, 1857, owing to carcinoma of the breast, which she had had some time, and which, owing to the application of caustic remedies, was in a sloughing state. She left the hospital much better, but again the tumour fungating, she was again treated with escharotics, and returned afterwards to the hospital owing to an enlargement in the right hypochondrium and vomiting. Ascites and jaundice came on, with much pain in the shoulders. She sank and died August 7th.

Post-mortem Examination.—The axillary glands were enlarged and occupied by scirrhous carcinoma. *Abdomen:* Much clear fluid existed in this cavity. The liver was greatly occupied by encephaloïd carcinoma and by fatty deposit, and compressed the duodenum and pyloric end of the stomach. The lumbar glands were occupied by carcinomatous material. The other organs were natural. *Thorax:* Organs natural. *Cranium:* In the white substance of the anterior lobe of each cerebral hemisphere, about half an inch from the surface, was a mass of soft yellow carcinomatous material, of the size of a pea, enclosed each of them in a distinct cyst-wall. The surrounding parts of the brain were natural.

Microscopical Examination.—The deposits consisted of numbers of large, compound, round, nucleated and nucleolated cells containing granular matter. In some cells the nuclei were very numerous. (192.)

CASE CXXVIII. *Carcinoma of the Dura Mater indenting the Left Hemisphere*

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[1] This case is related at much greater length in Trans. of the Path. Society, vol. ix. p. 20. In the King's College Path. Collection is a specimen, No. 776, showing a single tubercle of melanotic growth on the superior surface of the left part of the pons Varolii; also another, No. 773, with small melanotic tumours, of the size of half a pea, studding the surface of the brain. And in the Westminster Hospital Museum is a specimen, L. L. 7, showing melanotis of the right lobe of the cerebellum from a patient who had the same disease in the eye and liver.

of the Brain.—Edward F., aged sixty-nine, admitted June 23rd, 1858, suffering from vomiting, head-ache, and vertigo. No paralytic symptoms existed, and no convulsive action occurred. He died July 20th.

Post-mortem Examination.—Abdomen: Carcinomatous disease of the bladder and of the iliac glands was found. *Cranium:* A carcinomatous growth was found connected with either side of the falx cerebri towards its posterior part, but was so to a greater degree on the left side of the falx, insomuch so as to cause an indentation in the left hemisphere of the brain to the extent of one-third of an inch in depth. (198.)

CASE CXXIX. *Carcinoma of the Dura Mater indenting the* RIGHT *Hemisphere of the Brain. No Cerebral Symptoms during Life.*—Charles K., aged thirty-two, was admitted February 10th, 1858. He had been suffering from dyspepsia, but he had never had vomiting. Five days before admission he had noticed an epigastric swelling, which in the course of time became much larger, elastic, and fluctuating. In spite of treatment he became greatly emaciated, and died March 2nd, with symptoms referrible to disease of the abdomen.

Post-mortem Examination.—Abdomen: Carcinomatous growths were found in the liver, omentum, and mesentery. *Cranium:* A carcinomatous tumour was found connected with the dura mater, covering the anterior edge of the right cerebral hemisphere of the brain, and passing down the longitudinal fissure, where it considerably indented the surface of the brain. This mass also perforated the bony walls of the cranium. (59.)

CASE CXXX. *Carcinoma of the Centre of the* RIGHT *Cerebral Hemisphere. Convulsions. Partial Hemiplegia on the Left Side.* (J. M. S., No. 8.) (1859, 202.)

CASE CXXXI. *Carcinoma (Encephaloïd) of the* LEFT *Cerebral Hemisphere. Cyst in connexion with the same. Carcinoma of other Organs. Convulsions before Death.*—Elizabeth H., aged forty-nine, had suffered from menorrhagia for three years, until about six weeks before admission, when the discharge ceased. Subsequently she had much scalding on passing her water, frequent micturition, &c., and also passed a small portion of calculus, and much of the lithates, in the urine. On admission, Jan. 11, 1860, there was great pain over the region of the bladder; the urine was alkaline, and contained much blood and ropy mucus. Opium, with mineral acids, and the pareira brava were given; and she frequently voided quantities of phosphate of lime in the urine. No calculus in the bladder could be detected by the sound. She became much thinner and very sallow, and the vaginal discharge, which was very offensive, returned. Before death, which occurred April 1st, severe convulsions, lasting several hours, came on.

Post-mortem Examination.—Cranium: The brain was very wet. Towards the surface of the left cerebral hemisphere, and near its anterior portion, all but (not quite) appearing on its surface, was a mass of soft, pulpy, cream-coloured, encephaloïd, carcinomatous material, having bright red bloodvessels intermixed; and in connexion with this was a cyst full of turbid fluid. The brain-substance around the cancer-mass was softened.

Microscopical Examination of the cancerous mass showed it to be entirely composed of nucleated cells. *Thorax and Abdomen:* Soft encephaloïd material was found occupying the lungs, uterus, vagina and bladder[1] (91.)

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[1] St. Thomas's Hospital Museum contains a specimen (Section N. No. 85) showing a globular cyst formed by a thin membrane in the middle lobe of the left cerebral hemisphere, which contained 3 ozs. of thin bloody fluid, and having several round nodules of fungoïd matter projecting into it, over which the parietes of the cyst are extended. And in the College of Surgeons' Path. Museum, Preparation No. 2074 shows, in a case of cancer of the left hemisphere of the cerebellum, a large cyst with a smooth lining, situated in the inferior part of the same hemisphere, and filled originally with a thick gelatinous-looking fluid and blood.

CASE CXXXII. *Carcinomatous Tumour in the Middle Horn of the* LEFT *Lateral Ventricle of the Brain. Convulsions. Symptoms resembling Fever.* (J. M. S., No. 9.) (1860, 312.)

CASE CXXXIII. *Carcinoma of the* LEFT *Cerebral Hemisphere. Carcinoma of the Lungs and Kidneys. Polypus of the Nose. Convulsions and Coma.*—William S., aged twenty-four, had had hæmoptysis in March, 1860, and was thought to be phthisical. Having in July been very unwell—"not himself"—for a week, and for two days been unable to speak, he was admitted into the hospital July 11th. At that time he was almost entirely unconscious, and he was suffering from so-called malignant polypus of the nose. He had had one leg amputated in November, 1858, owing to cancer of the tibia; the stump was quite healthy. Two days after admission he had an epileptic fit, which lasted half an hour, the *left* side of the body being especially convulsed. Subsequently the upper lid of the left eye drooped. He never recognised any one, became thoroughly comatose, and died on the 24th of July, no positive paralytic symptoms occurring.

Post-mortem Examination.—*Cranium:* The cranial bones and cerebral membranes were natural. On slicing the brain, a mass (the size of a nut) of carcinomatous material was found in the posterior part of the *left* cerebral hemisphere, situated external to the lateral ventricle. This mass was parti-coloured and tolerably firm, and, when examined *microscopically*, was found to consist of numbers of nuclear bodies, with occasional fibre-cells intermixed. The other parts of the body were natural. *Facial Bones:* On examining the roof of the nose, a mucous polypus was found attached to the mucous membrane of the part. *Thorax* and *Abdomen:* Cancerous masses were found in the lungs and in the kidneys. (210.)

CASE CXXXIV. *Carcinoma of the* RIGHT *Cerebral Hemisphere. Complete Hemiplegia of the Left, and Partial of the Right Side. Ptosis of the Right Upper Eyelid.* (J. M. S., No. 7.) (1862, 121.)

CASE CXXXV. *Carcinoma of the Dura Mater at the Base of the Skull, indenting and softening the Brain. Carcinoma of the Eyeball. Convulsions before Death.*—Frances S., aged four, pale, strumous-looking, admitted January 29th, 1862, with fungus hæmatodes of the right eyeball, which had bled much. She had never had any "fits," but complained much of pain in the right temple. The cervical glands were much enlarged. In about two weeks the tumour of the eye began to ulcerate, after several attacks of hæmorrhage from it had occurred, the fœtid discharge containing pus-globules and many cells with nuclei and nucleoli. A succession of convulsive attacks came on, and she died March 7th.

Post-mortem Examination.—The affected eye was found to have been completely destroyed by the growth. *Cranium:* Superficial cerebral veins distended. A dark-coloured encephaloïd carcinomatous mass was found (of the size of an orange) closely attached to the base of the skull, and occupying the dura mater, extending from the edge of the lesser wing of the sphenoïd bone backwards to the posterior clinoïd processes, so as to fill up the whole of the sella turcica, and causing absorption of the lower portion of the *right* cerebral hemisphere. The surrounding brain-substance was softened, and the optic nerve on the right side was quite destroyed by the pressure of the growth; whilst the optic nerve on the left side was quite imbedded in the growth. This carcinomatous mass within the skull was continuous with that within the cavity of the orbit through the optic foramen, and appeared to have passed inside the sheath of the optic nerve, which was dilated and thickened. Other organs of the body were not examined. (61.)

Case CXXXVI. *Carcinomatous Deposit in the* LEFT *Optic Thalamus. Brain substance around indurated. Partial Hemiplegia on the* RIGHT *side. Coma. Epileptic attacks.*—James O., aged twenty-one, admitted May 13th, 1863, having been in every way in good health until the end of the year 1862, when he first experienced acute pain in the head. In January he complained of "weakness" in the *right* arm, and in March, having had a fit, in which he lost consciousness, he was observed to drag the *right* leg. On admission, his manner was heavy and stupid, and almost idiotic. Only partial power of moving the left arm and right leg existed. A few days later he fell into an almost comatose state, but under blistering and aperients much improved. He complained of pain all up the right leg and the left arm. *Both legs and arms were of the same temperature.* Pupils of both eyes largely dilated. He subsequently improved in all respects, both bodily and mentally, but on the 7th of June had an attack of epistaxis, and was drowsy. He again lost power in his limbs, and vomited. Evacuations passed involuntarily. The pulse rose to 100, but, later, fell to 68 per minute, and was irregular. After a succession of epileptic fits, lasting almost continuously for twenty-four hours, he died June 22nd.

Post-mortem Examination.—Cranium: Cerebral convolutions flattened; the veins between them very distinct. The left lateral ventricle contained about an ounce of clear fluid, and was much encroached upon by a growth in the anterior and inner part of the left optic thalamus. This growth, of about an inch in length, half an inch in width, and three-fourths of an inch in vertical direction, was of a yellow colour, and formed of semi-transparent material, having much resemblance to fibrin, being spongy, and exuding serum on pressure. In some parts of it were small patches of extravasated blood. All around the growth the brain was *indurated*.

Microscopical Examination.—The growth was found to consist of irregular, angular and many-shaped opaque cells, of about the size of pus-globules, mingled with granular matter. A few of the cells only contained nuclei. *Thorax:* The pericardial sac was full of clear fluid, and patches of old false membrane existed. In the right lung was a small patch of extravasated blood. All other organs of body natural. (157.)

Case CXXXVII. *Carcinoma of the Floor of the* LEFT *Lateral Ventricle. Convulsions. Loss of Speech.* (J. M. S., No. 10. 1863. 229.)

Case CXXXVIII. *Fungous Growths from the Cerebral Dura Mater, and from the Periosteum of the Dorsal and Lumbar Vertebræ.*—The history of this case, unfortunately, is unknown. The specimen was described by Professor Schrœder van der Kolk, and is now contained in the pathological part of his private collection purchased by the University of Oxford.[1] In this specimen are seen three of the so-called fungi of the dura mater, well marked, and a fourth, a smaller one, near the longitudinal sinus; they have all the appearance of medullary cancer, and contain a large number of bloodvessels. Inasmuch as Wenzel, Walther, and Chelius are at variance as to the part from whence they spring, whether from the dura mater or from the diploë, or from the pericranium; Van der Kolk injected the middle meningeal arteries, to see whether the fungi received their supply of blood from these arteries. The preparation shows that they are coloured with the red fluid which has filled everywhere the branches of the middle meningeal, and that they have therefore grown from the dura mater itself.[2] But, as he regarded the outer layer of the dura mater in the light of true periosteum, he considered these growths to be fungi of the periosteum, exactly analogous to those met with in connexion with other bones. From the same case there exists a skull also in the museum, in which are seen several foramina: in four of these, the destruction of the bone from the pressure of the fungi does not amount to complete perforation; only the inner table and diploë have been eaten away. In four others, however, the perforation is complete, the external table having been likewise involved in destruction. Other specimens in the Museum show similar growths from the periosteum of the dorsal and lumbar vertebræ, the bodies of which have been destroyed by pressure.

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[1] Now preserved in the new museum at Oxford, and catalogued in S. v. d. Kolk's collection as G 3.

[2] In King's College Museum, Preparation 772 appears in a very remarkabl manner to show the large medullary growth commencing iu the diploë of the crania bones, and extending outward to the scalp, and inwards to the dura mater.

CASE CXXXIX. *Encephaloïd Carcinomatous Tumour of the* RIGHT *Lobe of the Cerebellum, projecting into a Cyst containing two ounces of fluid.*—The carcinomatous mass projecting into the cyst is shown in the accompanying Woodcut. No. 8.[1] (J. M. S., No. 15.)

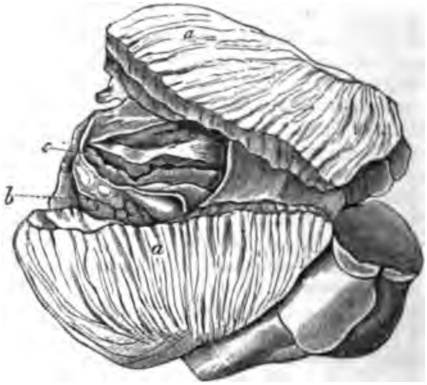

Fig. 8, showing a cyst in the substance of the cerebellum (laid open,) into which projects an uneven nodulated mass of carcinomatous material: *a*, the external surface of the cerebellum; *b*, the nodulated mass at the bottom of the cyst invested by the lining membrane of the cyst; *c*, shows section of the morbid mass deprived of its investment.

CASE CXL. *Carcinomatous Tumour connected with the Floor of the* FOURTH *Cerebral Ventricle. Similar Tumours in other parts of the Brain and in other Viscera. Atrophy of the Sixth Cranial Nerve, and Paralysis of the External Rectus of the Eye.*—George F., aged forty, who had been the subject of certain nervous symptoms which had been attributed to lead-poisoning, was admitted into Guy's Hospital. It was clear that he had some cerebral disease; he had a heavy expression of countenance, he spoke with difficulty, had headache and singing noises in the ears, and there was slight paralysis of the left side of the face, also of the external rectus of the left eye. There was a tumour on one hand, and it was soon observed that the veins in the neck were enlarged. He also had some difficulty in breathing, and it was soon evident that some pressure existed on the superior vena cava. He remained in the same state for a long period, when he gradually fell into a lethargic condition, and wasted away until death.

Post-mortem Examination.—Thorax and Abdomen: Carcinomatous masses were found in the organs of both these cavities. *Cranium:* Two small cancerous tumours were found in the posterior part of one of the cerebral hemispheres, and separating the lobes of the cerebellum. A similar growth was found in the fourth ventricle. This was of the size of a walnut, and grew from the floor of the ventricle, more on the left side, and appeared to spring from the surface without penetrating into the substance. The ventricle was much expanded, and formed, as it were, a case around it, but without being adherent. On cutting through the pons Varolii, the tumour was found not to have involved it, though probably it must, to a certain extent, have been implicated, to account for the paralysis of certain nerves. The sixth nerve on the left side was much diminished in size. The brain-substance around the tumour was not affected.

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[1] Preparation in Hosp. Path. Cat., Series viii. No. 43.

I have to thank Dr. Wilks for the details of this case.[1]

Case CXLI. *Encephaloïd Carcinomatous Tumour connected with the Dura Mater, lining the Anterior and Middle Fossa of the Skull on the* RIGHT *Side. Comatose attacks.*—A. B., an adult female, for several months before death, had been subject to frequent comatose attacks preceded by excitement and restlessness. The mind gradually became confused, and the restlessness increased. Her death took place during one of the above-described attacks.

Post-mortem Examination.—Cranium: A circumscribed tumour, of about the size of a small orange, sprang from the surface of the dura mater, covering the right orbital plate of the frontal bone in its posterior half. It extended also backwards into the middle cranial fossa. The right cerebral hemisphere, corresponding in its position to the tumour, was displaced, compressed, and softened, more especially about the apex of the middle lobe and the bottom of the descending cornu. The right corpus striatum and optic thalamus were pushed towards the left side. The ventricular cavities were dilated, and the quantity of ventricular fluid was increased. The cranial bones were not affected. The tumour was separated from actual contact with the cerebral substance by a thin vascular membrane, evidently the pia mater, from which bloodvessels were traced into the interior of the tumour. The tumour was of soft consistence, of a colour like grey cerebral substance, and when cut across gave on the surface of the section numerous small vascular points.

Microscopical Examination.—The tumour was seen to consist of the following anatomical elements: Numerous oval, well-defined particles resembling those often described as "free nuclei;" numerous uni-caudate or bi-caudate cells, distinctly nucleated; numerous pale, circular, or oval cells, with circular or oval nuclei, which were either situated in the centre or close to the periphery of the cell. Scarcely any free granular matter was visible. The free nuclear particles were more numerous in the part of the tumour lying next and springing from the dura mater.

For the opportunity of detailing this case, I have to thank A. Turner, Esq., M.B. (of the College, Edinburgh), the note on the symptoms being furnished by Dr. John Smith, Physician to the City Parochial Board, Edinburgh.[2]

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[1] For an instance of villous growth in the fourth ventricle, see the Brit. and For. Med.-Chir. Review, vol. xxxi. p. 248. I may also allude to a specimen (No 766) in the King's College Pathological Collection of a so-called medullary tumour in the *fourth* ventricle, and also to another in the same collection (No. 780,) of the size of half a walnut, situated in the floor of the right part of the same (the fourth) ventricle. It seems doubtful whether this is carcinomatous or not. It was removed from the body of a physician, Dr. J., aged forty-three, who had been becoming gradually paralytic for two years, and whose mind was peculiarly affected, as he could recollect and reason upon long-past events, but constantly forgot all that he had read the day before.

[2] I cannot forbear here from referring to a remarkable case in the King's College

IV. Fibrous, Fibro-plastic, Fibro-nucleated, Fibro-cellular, Fibro-cystic, Fibro-fatty, and Fibroid Growths of the Brain and its Membranes (whether connected with Syphilis or not).

Case CXLII. *Fibrous Tumour of the Tentorium Cerebelli. Softening of the* RIGHT *Cerebellar Lobe. Death from Erysipelas.*—Anne J., aged sixty-six, was admitted October 28th, 1840, complaining of giddiness and pain in the head, generally intensified by eating, although the appetite remained good. These symptoms increased, and, in December, shivering, followed by great heat of the body, set in. Leeches were applied to the temples, but on the day afterwards erysipelatous inflammation attacked the leech-bites, and spread over the neck and back, and of this the patient died December 14th.

Post-mortem Examination.—Cranium: Bones of the skull natural. The cerebral membranes were generally thickened, and much serous effusion existed in the sub-arachnoïd tissues and in the ventricles. To the under surface of the tentorium cerebelli a large fibrous tumour was attached by means of a pedicle, causing by its pressure a certain amount of softening of the right cerebellar lobe.[1] All other parts of the body were quite natural.

Microscopical Examination.—The tumour was found, after long maceration in spirit, to consist almost entirely of distinct fibrous tissue, the fibres being rendered very faint by the addition of acetic acid, and in some cases almost invisible; mixed with the fibres were numbers of elongated, fusiform cells, showing in some cases delicate nuclei. See Lithograph Plate, No. II., Fig. 1.

Case CXLIII. *Fibrous Deposit in the Middle Lobe of the* RIGHT *Cerebral Hemisphere. Fibrous Thickening of the Cerebral Membranes, and of the Periosteum lining the Right Orbit. Proptosis. Epileptic Seizures and Coma before Death* (? Syphilitic in nature).—John G., age unknown, admitted November 25th, 1847, having for five years been subject to occasional pain in the fore-head. Four years previously had had an epileptic attack, but NONE SINCE; and four months before admission the pain in the head had become fixed. The right eye for seven months had been noticed as being very prominent, and of late vision in it had been impaired. More recently, nausea and vomiting, with slowness of speech, and more decidedly impaired vision, with difficulty of articulation, and difficulty in "smelling" with the *right* nostril, had come on. The memory had become bad, and sometimes he had been rather deaf. On admission, the expression of his countenance was "heavy," face swelled, manner slow and confused, speech slow, and right eye very prominent, its pupil being much dilated and very "sluggish." The pupil of the *left* eye was moderately contracted, and quite sensible to light. There was slight drooping of the upper lids of both eyes. Pulse 54 per minute; bowels confined; tongue white; urine free from albumen. Pain complained of across the fore-head and in the right ear; also nausea and vomiting. Heart and lung sounds natural. Ordered to be blistered behind the ears, and to take aperients, with salines and tincture of cantharides. He became comatose and stertorous, the evacuations being passed involuntarily. The pulse became very slow, the pupils very dilated and insensible, and he was cupped between the shoulders to ten ounces. During this operation much purulent fluid

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Museum (No. 762) of a large encephaloïd tumour of about the size of a small orange, connected with the left crus cerebelli. No history exists. In St. Mary's Hospital, G c, No. 9, shows pressure upon the middle crus cerebelli of the right side, and pons Varolii by a tumour connected with the cerebellum.

[1] See Hospital Path. Catalogue, Series viii. 88.

came away from the right nostril, and shortly after this he regained his sensibility. On the following day the pain was much less, and he was greatly improved, the sight being better and eye less prominent. The discharge from the nostril continued, and at times was attended with blood. The pain, however, never wholly departed, and he was often very giddy. Subsequently the pain much increased, his manner became very slow, and articulation worse, the pupils very dilated and insensible, and the right eye again more prominent. He died January 29th.

Post-mortem Examination.—Cranium: Bones of skull very thickened, and especially the os frontis. The surface of the brain was very dry; convolutions flattened; lateral ventricles distended with fluid; the under surface of the anterior lobe of the brain on the *right* side was softened, and the arachnoïd covering it was adherent to the dura mater. The anterior part of the middle lobe of the brain on this side was very adherent to the dura mater also, and on making a separation a mass of cartilaginous hardness had to be cut into. In the substance of the anterior part a very indurated portion, of the size of a walnut, was found, surrounded by softened brain, implicating the chief part of the middle lobe. The membranes lining the middle cerebral fossa of the skull were much thickened, and in many parts very indurated. The bone corresponding thereto was roughened, and very much hardened. The periosteum lining the right orbit was much thickened, and also of exceeding hardness, and the mucous membrane lining the nostril was much inflamed. *Thorax:* The lungs were congested; the left ventricle of the heart was hypertrophied; otherwise, the organs were natural. *Abdomen:* Organs natural. (32.)

CASE CXLIV. *Cystic Tumour connected with the Choroïd Plexus. Exceedingly Distended Ventricles. Perforation of the Dura Mater and Cavity in the Bones of the Skull containing Herniated Brain. Facial Paralysis. Stupor and Cataleptic condition.*—Louisa C., aged thirty-four, admitted April 21st, 1858. She was a married woman, who had been confined of a dead child three months previously, having had a tedious labour, followed by violent pain in the head, drowsiness, and languor. She was said then to have lost all power of raising her lower limbs. Sensation was, however, fully marked on admission. The tongue was pale; the bowels costive; pulse feeble; evacuations passed involuntarily. No account could be obtained from her. Ordered ammonia and wine, and blisters to the nape of the neck. The left side of the face became wanting in expression, and the mouth a little drawn. Pain in the head—which she often rolled from side to side—was complained of. The stupor became marked; a slight cataleptic affection came on, the hands remaining in any position in which they were placed. Confirmed stupor supervened. The pupils became dilated; sordes of the mouth appeared, and erysipelas of face came on before death, which occurred May 13th.

Post-mortem Examination.—Uterus tumid, lined by lymph; otherwise natural. *Cranium:* Three small pits in the inner surface of the bone, near the centre, of which two were occupied by Pacchionian bodies; the third, which nearly perforated the bone, contained a small portion of the cortical substance of the brain, which had perforated the dura mater, causing a round hole in it. This herniated piece was situated close over the apex of the dilated ventricular cavity. Lateral ventricles excessively dilated; the two lateral and the third ventricles forming one cavity filled with turbid bloody fluid. Connected with the left choroïd plexus was a large tumour, lying loosely attached to the upper surface of the optic thalamus and passing down into the descending cornu of the ventricle, which was more distended than any other part of the cavity. This tumour was composed of cysts, filled mostly with fluid or clotted blood, united by granular stroma containing bloodvessels and calcareous matter.

The surface of the optic thalamus was softened; that of the rest of the ventricular cavity was covered over by a rough papillary layer of lymph, consisting partly of corpuscles and partly of fibrin.

Microscopical Examination.—The above-mentioned granular stroma (see Lithograph Plate II. Fig. 4) showed small cysts, much fat, some tubes, about the size of those of the kidney, without definite structure, coated with fat (degenerated bloodvessels), numerous nuclear bodies, blood-globules variously disintegrated, and much pigment. The opposite choroïd plexus was healthy. A reticular mass uniting them, and partially filling the ventricular cavity, existed, thought to be the remains of the velum interpositum.[1] (136.)

Case CXLV. *Fibrous Growth connected with the Dura Mater, forming a Tumour beneath the Scalp. Perforation of the Calvarium. Epileptic Attacks. Death from Gangrene of the Lungs.*—William M., aged sixty-four, was admitted into the Hospital December 13th, 1842, with a tumour on the crown of the head, which had been noticed three years, and which had been discovered originally by accident when about three inches in diameter, and only raised slightly above the surrounding parts. When admitted into hospital, the tumour had greatly increased. He had lately had frequent attacks of giddiness on turning quickly round or stooping, and had shiverings and twitches of the limbs, but never suffered inconvenience therefrom until a few days before admission, when he fell down in a state of unconsciousness (apparently without paralysis), which lasted a considerable time, leaving him on the next day weak, and with pains in his legs. His memory had been much impaired since the commencement of the disease. The outer surface of the skull, where the tumour existed, was absorbed in places (where pulsation could be felt), and was irregular, chiefly osseous, but softer in the depressed parts. Having remained in the hospital until March, 1843, without any material change occurring, taking the iodide of potassium, he was discharged, but re-admitted in April, and had several fits. Again he went out, and again came in, November, 1844, and remained, with an interval of three months, until October, 1845, and during this time was brought under the influence of a course of mercury, but without any change in symptoms. He had no fits during this period, excepting one a few days before admission, and another during the interval when he was an out-patient. In December, 1844, he had a bad cough, and the tumour increased much during the acts of coughing. At this time the tumour was soft and pulsating, and capable of being diminished by pressure, after which the level was restored by apparently three beats of the vessel. In October, 1845, he had a hydrocele tapped. His next admission was in August, 1847, when the only fresh symptom was considerable dimness of sight. In the middle of January he was much the same; memory very defective. He had had some epileptic attacks. He was in the hospital three or four times, and at last was admitted in June, 1854, owing to pneumonia, which ended in gangrene of the lung, of which he died, June 16th (between fifteen and sixteen years after the tumour was first noticed).

Post-mortem Examination.—*Cranium:* Pericranium closely adherent to the tumour, and much thickened; cranial bones wanting in diploë, but not thickened. The tumour was composed of bone superficially, lobulated on its surface; more deeply of a reddish-white fibrous structure, mixed with delicate spicula of bone. Below this was a perforation in the skull as large as a fourpenny-piece, leading to a similar growth of bone and soft tissue between the dura mater and the bone. There was also a perforation of similar extent in the dura mater, where the growth pressed directly on the brain, and at this part the membranes were adherent. Excepting by compression, the brain was not affected.

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[1] I have not in this series included cases so often found, of small cystiform bodies in connexion with the choroid plexuses.

Microscopical Examination.—The soft parts of the tumour were composed entirely of spindle-shaped fibres.

Thorax and Abdomen: Extensive gangrene of the right lung, also softening of the spleen, and a granular state of the kidneys, were found. (155.)

CASE CXLVI. *Firm Tumours connected with the Inner Surface of the Dura Mater on the* LEFT *Side. Remains of Blood Extravasated in the* LEFT *Optic Thalamus.*—Elizabeth B., aged fifty-six, was admitted June 3rd, 1843, owing to strangulated hernia, for which she had been operated on. She died on the following day; but we have no history of the existence of any brain-symptoms.

Post-mortem Examination. — *Abdomen:* Indications of peritonitis existed. *Cranium:* The dura mater was greatly congested; it presented on the left of the falx cerebri three or four small white oval tumours connected with its inner surface, very firm, and of uniform consistence. One much larger than the others had indented the brain. The anterior parts of the brain also presented many bloody puncta on section. The left optic thalamus was occupied by a mass of soft greenish-brown structure (one and a half inch long and half an inch deep), the remains of former extravasation of blood. (116.)

CASE CXLVII. *Cellular Growth in the* RIGHT *Cerebral Hemisphere. Convulsive Attack and Coma preceded Death.*—Felix S., aged forty-two, was admitted June 7th, 1854, having been ill eight months. He first had felt numbness and tingling in the left arm, and subsequently pain in the head, especially at the forehead, keeping him awake at night. At times he had indistinctness of sight—a double vision; but there had been no paralysis of the limbs, &c. On admission there was a peculiarity of manner and nervous excitement. The pulse was quick, the tongue foul. The numbness of the arm was described as a kind of tingling; anæsthesia was not complete. No relief was obtained from cupping and the use of calomel thrice a day, and pain in the head and giddiness increased, and he became unable to stand. Numbness of the right leg and of the left arm came on, and he had constant double vision. After the use of a blister, the pain in the head was relieved, but it subsequently returned. He fluctuated for some time as to pain and double vision, the mind remaining clear. Later on, the mind became affected, and an epileptic attack came on, leaving him comatose, with stertorous breathing; and he died July 1st.

Post-mortem Examination.—*Cranium:* The calvarium was healthy. The vessels of the dura mater were very congested, and the surface of the cerebral convolutions was dry and flattened. The substance of the brain was very firm, and a fewer number of "puncta" existed in it than usual. The left lateral ventricle contained much clear fluid; the right one was pushed somewhat towards the median line of the brain by a tumour which occupied the central part of the right cerebral hemisphere to the outer side of the corpus striatum and optic thalamus. This growth was elongated, and of about the size of a goose's egg, having a reddish-grey circumference, moderately soft, about one-third of an inch in thickness. It had an undulated surface, and was very vascular.

Microscopical Examination.—The growth was composed of small circular and oval-shaped nuclei filled with granular contents, and a few spindle-shaped cells; no nucleated cells were seen. The central and softer part of the tumour was composed chiefly of an amorphous granular basis, with few nuclei. Other organs of the body were not examined. (172.)

CASE CXLVIII. *Fibro-cystic Growths of the Dura Mater and Skull. Stupor* *before Death.*—Ann C., aged fifty-five, admitted for two tumours, one of the thyroïd body,[1] and another opposite the posterior part of the right parietal bone of the skull, from which serum and blood escaped through an opening which had been made in it. On the day after admission, rigors and nausea set in, followed by head-ache and confusion of thought. Much discharge took place from the tumour, and restlessness came on; the pulse became weak and small, and dysphagia ensued. Stupor preceded death, which occurred three days after admission.

Post-mortem Examination.—*Cranium:* The tumour beneath the scalp was found to be a fibrous growth, containing numbers of cysts of various sizes, and to be continuous, by means of a large ulcerated opening through the parietal bone, of about the size of half-a-crown, with a similar growth connected with the dura mater corresponding, which was in all other places natural. The fibrous growth attached to the dura mater formed a kind of ring, through the centre of which the dura mater could be seen unoccupied by it.[2] The inner surface of the dura mater, opposite the point where the fibrous growth existed, was smooth and depressed and somewhat wrinkled.

Microscopical Examination.—The growth, many years after maceration in spirit, was found, in addition to firm fibrous tissue, to present chiefly small cells, elongated and fusiform, and club-shaped and oval, most of them containing nuclei, very clear, and brightly refracting the light. Numbers of rounded and angular bodies (see Lithograph Plate II., Fig. 2*a*), apparently the remains of former blood-globules, existed, in many cases in close proximity with their neighbours, in others separated and surrounded by a finely granular stroma. Many cells were passing into fibres, (*b*,) and many were arranged side by side in a regular order, (*c*), the thicker extremity of one being in close connexion with the fine one of the other. Several round and oval cells (*d*), of very large size, and containing granular matter and one or two nuclei, were also seen. Towards the base of the growth much firm but delicate wavy fibrous tissue existed, and in one or two places the fibrous growth was so arranged as to form a kind of alveolus. With all this the cell-forms were mixed indiscriminately.

CASE CXLIX. *Fibro-cellular Growth (partly Epithelial?) from the Dura Mater on the* RIGHT *Side. Absence of Cerebral Symptoms.*—Elizabeth M., aged seventy, having been admitted Feb. 21st, died in the hospital March 6th, 1855, of pneumonia, and diseased heart and kidneys. No symptoms referrible to the brain had existed.

Post-mortem Examination. — *Cranium:* Skull natural. Connected with the dura mater, covering the right cerebral hemisphere, close to the superior longitudinal sinus, and, as it were, formed between two laminæ of the dura mater, was a reddish-brown fibrous growth, of the size of a walnut, indenting the cerebral surface. It was firm, and was covered on its under surface by fine blood-vessels. The brain and membranes were otherwise healthy.

Microscopical Examination. — The tumour consisted of fibrous tissue, containing cell-forms of various sizes and shapes, chiefly large and of a round or oval shape, some being fusiform. Several small ones contained semi-opaque material, with highly refracting bodies like nuclei; others again contained one or two large nuclei with granular contents. The larger ones, for the most part nucleated, were collected into groups of two or three, and surrounded by laminated epithelium-like cells forming a capsule or alveolus. Here and there numbers of oval cells were accumulated; and occasionally round crystals, many with concentric, and others with radiating marks of carbonate of lime. Moreover, cells of irregular shape, like nuclei, were found. (77.)[1]

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[1] Hospital Path. Catalogue, Series x. No. 21.

[2] Hospital Path. Catalogue, Series viii. No. 89, and also Series ii. No. 154, where the tumour of the scalp and diseased bone are described.

CASE CL. *Fibrous Tumour containing Soft Pultaceous Material attached to the Inner Surface of the Dura Mater on the Left Side. Facial Paralysis.*—Anne C., aged fifty-two, admitted April 18th, 1855. Had complained for one year of great debility, but worse the past four months, having had much languor, and pain in the limbs, with slight cough. On admission she was numbed and "cold all over;" the legs were anasarcous; she had had little sleep. The fæcal evacuations had sometimes been involuntary, and she had suffered at times from incontinence of urine. After a short time purulent inflammation of the left eye came on, and on the 27th, it was remarked that only the *left* side of the mouth was used in speaking. The numbness before complained of continued. Quinine was given her, and at times a little chalk mixture, and an opiate enema, owing to diarrhœa. On the 3rd of May, erysipelatous inflammation of the left side of the face came on, bed-sores formed, and later on there was much swelling of the left leg. On the 6th, there was much delirium, and she quietly sank into a dozing state, and died on the 7th.

Post-mortem Examination.—All the limbs were very rigid. *Cranium:* On the left side of the vertex the outer surface of the cranium presented a slight exostosis. The dura mater was generally adherent to the cranium, and much sub-arachnoïd fluid existed. Attached to the inner surface of the dura mater, covering the *left* cerebral hemisphere, and near the vertex and the longitudinal fissure, was a small growth of about the size of a fourpenny-piece, firm and solid, and consisting of fibrous tissue (see Lithograph Plate III. Fig. 4) externally, but containing a quantity of pultaceous and soft material, and on the surface of the brain corresponding was a slight depression, to which the growth was adapted; the brain at this part was however not softened, and throughout its substance this organ was healthy, excepting slight softening of the central white parts. The arteries at the base of the brain were slightly atheromatous. *Spine:* The spinal-cord and its membranes were healthy, excepting slight calcareous deposits in the substance of the arachnoïd membrane. *Thorax:* The lungs were emphysematous, but otherwise natural. Heart natural. *Abdomen:* The kidneys were of a yellow colour, and their capsules adherent. The capsules of the liver and spleen were very thickened. The common iliac vein, and its two subdivisions, contained a large quantity of firm fibrinous coagulum. (140.)[2]

CASE CLI. *Fibrous Material, forming a Nodulated Mass, connected with the Wall of the* LEFT *Lateral Ventricle.*—Anne F., aged fifty-four, was admitted Dec. 27th, 1855, in a very weak state both as to body and mind. For one year and a quarter she had been paralysed as to the lower limbs, but she applied to the hospital owing to sloughing and painful ulcers on the legs, of about six weeks' standing. Under the use of suitable remedies, the ulcers much improved in one leg, but increased in the other. Vomiting came on, and her complexion assumed a very yellow appearance. No pain or rigors were complained of, but she became delirious, and died January 23rd, 1856.

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[1] See Hospital Path. Catalogue, Series viii. No. 90, also Trans. of Path. Soc., vol. viii. p. 13, where the microscopical appearances of the tumour are presented in a lithograph plate. In the Middlesex Hospital Museum, Nos. 2^1, 41, and 45, in Series v., are described as epithelial cancer of the dura mater. Of these, the first is a case of Mr. De Morgan's; the second was removed from the body of a woman whose scalp was similarly affected, and in whom abscess of the cerebellum existed; and the last was associated with epithelial growth of the dura mater, perforation of the skull having taken place. I would here refer to a tumour (described by Mr. Part in the Trans. of the Pathol. Soc., vol. vii. p. 25,) a portion of which that gentleman allowed me to place in our Museum as Preparation 91, Series viii. The microscopical characters of the tumour, which I reported upon, are delineated in Plate III. as Fig. 2.

[2] In the Pathological Museum of St. Mary's Hospital is a preparation, G. c. 16, of cancer of the brain external to the corpus striatum, in which, for some time, the only symptom was facial paralysis.

Post-mortem Examination.—Thorax: The heart was large, and very fatty and softened. The lungs were congested. *Abdomen:* The liver was large and heavy, and of a gamboge colour, with rounded edges, and greasy on section. The spleen was almost diffluent. *Cranium:* Skull and brain healthy, but connected with the upper wall of the left ventricle was a light-coloured mass occupying the surface to about the extent of a fourpenny-piece, being nodulated and indurated, and about one-eighth of an inch in depth. Moreover, there was a thick and dense band of adhesion passing between the ventricular wall in front of the part where the mass was and the opposite and corresponding surface of the corpus striatum.

Microscopical Examination proved the mass above described to be in reality a quantity of firm and consolidated fibrin, forming a kind of fibroïd deposit, which most likely had arisen from the aggregation and induration of ordinary fibrin effused into the ventricular cavity under some inflammatory action. No regular cell-structures were observable, and only very delicate fibrous tissue imbedded in a slightly yellowish matrix. No masses of colouring matter were detected. (18.)

CASE CLII. LEFT *Optic Thalamus occupied by a Fibro-Cellular Growth of peculiar Character. Peculiar Hysterical Manner. Coma before Death.*—Mary D., aged nineteen, was admitted March 14th, 1856, with head-ache, sickness (of which she had only complained four days), furred tongue, great thirst, and a pulse of ninety-eight. It appeared as if she was suffering from fever; and salines and cold lotions to the head were used. Pain at the right iliac region, and a peculiar hysteria-like manner came on, followed by vomiting. The head-ache continued, drowsiness came on, and she died comatose, April 13th, no loss of power in any part or delirium being noticed.

Post-mortem Examination.—Cranium: The bones of the skull and the cerebral membranes were quite natural, the cerebral convolutions were deep and flattened. Both lateral venticles were distended by turbid fluid, and their walls were softened, as was also the right optic thalamus. The *left* optic thalamus was three times its ordinary size, and encroached much upon the right ventricle. It was of a lightish yellow colour, and very soft, and uniformly of the consistence of soft putty.

Microscopical Examination.—The enlarged thalamus was found to contain numbers of very delicate and fine fibrous tissue, mostly possessing delicate granular nuclei, chiefly oval; and, though in scanty numbers, rounded and oval cells with one, two, three, or four nuclei. Very little granular matter, and no stroma existed. In the other optic thalamus much granular matter only was noticed, in addition to the ordinary elements of this part. *Thorax* and *Abdomen:* Congestion of the lungs and increased enlargement of many of the glands of the intestines existed. Otherwise, the remaining organs of the body were natural.[1] (84.)

CASE CLIII. *Fibroïd Deposits connected with the Outer Surface of the Dura Mater. Corresponding Depression in the Bone of the Skull. (Probably Syphilitic in origin.) Absence of Cerebral Symptoms.*—Lavinia T., aged twenty-seven, who had had three attacks of rheumatic fever, followed by anasarca and palpitation of the heart, was admitted October 22nd, 1856, with obvious disease of the heart. She died November 27th, no symptoms of intra-cranial mischief having manifested themselves.

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[1] See preparation in Hosp. Path. Cat., Series viii. No. 48; also Trans. Path. Soc. vol. vii. p. 12, where the histological characters of the growth are delineated in a lithograph plate.

Post-mortem Examination.—Cranium: The external surface of the vault of the skull at one part presented a slight depression where the scalp was adherent to the bone, and very thickened; otherwise the skull was natural. Connected with the outer surfaces of the dura mater, covering the upper part of the brain, and corresponding to depressions in the inner table of the skull, were two deposits of a fibrinous character—one being on either side of the median line. They projected from the outer surface of the membrane, and were flattened as if by pressure against the cranial bones, and somewhat puckered and indented. The inner surface of the dura mater corresponding was smooth and even. To one of the fibrinous masses with its depression in the bone corresponded the depression on the outer surface of the skull before described.[1] *Thorax:* Much turbid fluid and a few old adhesions existed in the pleural sacs. The heart was much enlarged, and the valve-flaps on either side much diseased. (265.)

Case CLIV. *Fibro-nuclear Growth from the Dura Mater on the* right *Side. Blood in the Arachnoïd Cavity on the same side of the Brain (the left). Carcinoma of the Lung. Hemiplegia of the* right *Side.*—Thomas S., age unknown, was admitted Sept. 27th, 1858, in a state of epileptic coma, having been found in the streets in a "fit," and thought to be drunk. It appeared that he had been subject to fits for four years, and that several members of his family had been subject to them, one relation having died from epilepsy in connexion with diseased brain, and two others having died insane. He remained unconscious until death (on the 29th), with almost complete hemiplegia on the *left* side. The urine was drawn off by catheter and found to be albuminous.

Post-mortem Examination.—Cranium: The cranial bones were thick and heavy. The dura mater covering the centre of the *right* cerebral hemisphere presented a flattened mass of morbid deposit on each of its surfaces, to the extent of half-a-crown, and the inner surface of the skull was slightly corroded; corresponding, on the same side, a considerable amount of blood existed in the arachnoïd cavity.

Microscopical Examination.—The growth of the dura mater was found to consist of nuclear bodies mixed with distinct fibre-cells, and most fine and delicately-formed fibrous tissue. (See Plate III. Fig. 3.) *Thorax:* Carcinomatous deposits existed in the lungs, and around them the tissue was hepatized. *Abdomen:* Kidneys granular. (237.)

Case CLV. *Diffused Interstitial Fibroïd and Cellular Deposit in the Substance of the* left *Cerebral Hemisphere. Convulsive Attacks. Elliptical Pupils. Partial Hemiplegia on the* right *Side.*—Sarah H., aged thirty-seven, admitted January 26th, 1859, having complained of being ill for six months, and having had a "fit" two weeks previous to admission, followed by hemiplegia on the right side, as also by rigors and much head-ache. On admission she was very heavy and stupid, and the muscles of the right arm were quite paralysed and quite rigid. Those of the right leg were paralysed also, but to a less degree than the arm, and were quite relaxed. The sensibility of the skin in the right limb was diminished. The right side of the face was inexpressive; the tongue protruded to the right. Both pupils were inactive, but somewhat dilated and equal in size. There was slight strabismus, speech was inarticulate; evacuations were passed involuntarily; urine albuminous. Ordered a blister to the nape of the neck, to be dressed with mercurial ointment, and calomel three grains thrice a day. After two days, the gums began to show the action of the mercury, and she was decidedly more intelligent. The mercury was ordered to be taken only twice a day. The gums remained sore, and the speech became more articulate; she became much less stupid, and the evacuations were not passed involuntarily. She improved until the 8th of Feb., when she became again more stupid, and passed her fæces involuntarily. On the 9th she had a convulsive attack, and became quite unconscious, the left arm and leg being thrown especially into a spasmodic state; the right arm, which had previously been clenched firmly on the chest, and the right leg, became extended rigidly. This rigidity lasted about three-quarters of an hour. After another quarter of an hour she regained consciousness, but remained very stupid. At one time afterwards it was found that both pupils were very contracted and ELLIPTICAL in shape. Coma supervened and preceded death, which occurred February 12th.

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[1] See Hospital Path. Cat., Series viii. No. 86.

Post-mortem Examination.—Cranium: Skull very dense, its diploë much consolidated; on its inner surface, at the left side, there was a degree of new bone attached, having a convex outline. The cerebral convolutions were generally flattened, and the breadth of the left cerebral hemisphere was found to be much greater than that of the right (almost double). A little above the corpus callosum, the deeper parts of the left hemisphere were found to be occupied by an interstitial deposit, creating almost a closure of the left ventricle, a section of which proved to be of a pearly colour when fresh, but soon became pink. This part was less consistent than the other parts of the brain, and became easily washed out by water. This interstitial deposit gradually shaded off into the healthy brain. The septum and surface of the walls of the left ventricle were rather softened. The other parts of the body were healthy, except that a tumour of the thyroïd body, and also a fibrous tumour of the uterus, existed. (37.)

Microscopical Examination.—Fewer nerve-tubes were found in the part than there should be, though these were quite natural in appearance; but a large amount of granular material, and oil-globules, and a few round colourless cell formations, having a double outline, were met with.

CASE CLVI. *Nucleated Tumour of the* LEFT *Optic Thalamus. Softening of the Crura Cerebri, &c. Convulsions and Coma before Death.*—Thomas B., a sailor, aged twenty-five, admitted October 17th, 1859. He was originally robust, but for four months had gradually been declining in health without any known cause. He had had continual pain in the head, chiefly the centre and left parietal region. This pain was generally dull, but was occasionally acute on exposure to the fire or sun, or when he moved much about. About a month before admission, his speech became inarticulate. There had never been any vomiting, and no affection of the special senses, nor of the muscles of the limbs. On admission, he walked with a tremulous gait, his speech was slow, having long pauses, and he got out his words with evident difficulty. He complained of "double vision" whenever *he looked above or below the horizontal line.* The muscular furrows of the face were more marked and deeper on the *left* side, the right eyebrow was more decidedly elevated, and the right corner of the mouth more depressed. The tongue was protruded in a straight line. Pulse 100, and weak. Ordered salines, with a blister to the nape of the neck, and a moderate amount of wine. About twelve days after admission he had a convulsive attack, and was for two hours insensible, afterwards being very drowsy and heavy. Coma, followed by vomiting of food, came on, also ptosis of the left upper eyelid. He died suddenly, November 4th.

Post-mortem Examination.—Cranium: The skull and cerebral membranes were natural. The lateral ventricles were much distended with serum. The crura cerebri and the parts of brain about the left optic thalamus were much softened, and the consistence of the entire brain diminished. In the left optic thalamus, and projecting almost to the base of the brain, was a hard tumour, of about the size of a nut, homogeneous in texture, and of a yellowish-brown colour on section, and showing a large number of bloodvessels.

Microscopical Examination.—The whole of the tumour was found to consist almost exclusively of very small nuclei, some having nucleoli, and others not. Other organs of the body were not examined. (244.)

CASE CLVII. *Fibro-nucleated Growth (Syphilitic?) of the Dura Mater. Convulsive Attacks.*—Edward B., aged twenty-three, admitted January 30th, 1861. One year previously he had had syphilis, followed by secondary eruptions, and some time before that had fallen down, and, as it was thought, had hurt his head. He had remained in good health until the 27th, when he had a "fit" of an epileptic nature, followed, three days afterwards, by a second one, when he was brought to the hospital. Cupped on the neck to ten ounces, and had eight grains of calomel. Two convulsive attacks of the same nature came on during the cupping, and these recurred in a few hours, taking place very rapidly. During the attack, the mouth was drawn down to the left, and the left arm and leg chiefly affected, and he said afterwards that though he appeared so he was not really unconscious. In the intervals, his face was flushed, and he was sometimes insensible, and at others conscious. The left arm and leg were quite without power of movement, but the sensibility remained entire apparently, though he said they felt to him numb. No facial paralysis. Right arm and leg natural. Complained of pain above the right eyebrow. The skin was hot and perspiring; the pulse full and strong. Sixteen ounces of blood were taken from the arm, and calomel and antimony given. After bleeding, the fits increased in number, coming on every ten minutes. He became stertorous. Divergent strabismus of the left eye came on. The urine was albuminous, containing "casts." The attacks became weaker and more frequent, and he died on the evening of February 1st.

Post-mortem Examination.—A few spots on the skin, and a patch of rupial ulceration existed. *Cranium:* Cranial bones, brain and membranes quite healthy, except that an opaque yellowish deposit, laminated and very dense, and of the size of a threepenny-piece, occupied the surface of the dura mater, covering the cribriform plate of the ethmoïd bone. This was surrounded by a quantity of ragged fibrous tissue.

Microscopical Examination of the deposit showed the presence of delicate fibrous tissue, some small nuclear bodies, and much pigmentary matter, and a few crystals of hæmatine. *Spinal Column:* The cord and membranes were healthy. All the other viscera were natural. (35.)

CASE CLVIII. *Large Fibroïd Nodulations on the Walls of the* LEFT *Cerebral Ventricle. Hemiplegia. Old Extravasations of Blood within the Brain.*—Benjamin B., aged forty-eight, admitted Oct. 16th, 1861, having been attacked with a "fit" on the day previously, and with hemiplegia of the left side. Previously he had enjoyed good health. The urine, which was passed unconsciously, contained albumen. His mind became more confused, and his speech more indistinct, and an abscess, attended by rigors, formed over one of the hips. He sank and died December 16th.

Post-mortem Examination.—*Thorax:* Pleural adhesions and indications of bronchitis existed, and slight atheroma of the aorta. *Abdomen:* The spleen was softened, the kidneys cysted and otherwise diseased. *Cranium:* Skull natural. Much fluid existed beneath the arachnoïd and in the ventricles. The remains of two former extravasations of blood existed in the right side of the brain—one as indicated by rusty discoloration beneath the surface of the corpus striatum, behind its centre, and about equal in size to a fourpenny-piece, surrounded by softened brain; and the other, anterior and external to this, between the corpus striatum and the fissure of Sylvius, but the brain around this was natural. The smaller cerebral vessels were natural, the larger ones very fat, but those at the base of the brain were natural. The lateral ventricles were enlarged and distended, and the lining of the left one was very much thickened and hardened, *and in two places on the surface of its inner wall existed two large nodulations* which proved to be firm fibroïd material. These, no doubt, as in Case CLI. of nodulated matter connected with the wall of the ventricle, were the remains of masses of fibrinous substance which had accumulated and become indurated. (302.)

Case CLIX. *Fibroïd Growth in the pons Varolii and various other parts of the Brain. Hemiplegia on the* RIGHT *Side.*—Thomas W., aged twenty-nine, was admitted September 17th, 1863. About seven weeks previously he had suddenly become "hemiplegic" on the *right* side, but did not in any way lose consciousness. He was taken to St. Mary's Hospital, and slowly recovered; but one week before he came to St. George's Hospital he suddenly became worse again. On admission, the muscles of the right arm and leg were quite paralysed as to motion, and very considerably so as to sensation. No reflex action could be produced by tickling the right foot. There was some puffing of the right cheek, and the breathing was heavy; the speech was indistinct, and the pupils dilated, but acting under sight. The tongue was furred and tremulous. The bladder was distended with ammoniacal urine, which had to be drawn off. In spite of counter-irritation the speech became more indistinct, and the evacuations involuntary. Vomiting and dysphagia came on. Dyspnœa with lividity of the face supervened. The pupils became more dilated, *the right one being the most so*, and drooping of the left upper eyelid came on. The fingers of the paralysed (the right) hand became firmly flexed upon the palm, and he soon died, on the 25th of September.

Post-mortem Examination.—*Thorax:* Lungs slightly congested. *Abdomen:* Liver in a state of early cirrhosis. The prostate contained a large abscess, and the walls of the bladder were very thickened. *Cranium:* Arachnoïd membrane thickened, especially at vertex. White substance of brain unusually vascular. Much fluid in the arachnoïd cavity and in both ventricles. A wedge-shaped white deposit, about an inch in length, was found beneath the surface of the *left* corpus striatum, surrounded by a zone of vascularity; a similar deposit existed in the *centre* and to the *anterior* part of the pons Varolii, of the size of a large bean; and another mass of the same nature, of the size of a filbert, existed in the anterior lobe of the *right* cerebral hemisphere just above the anterior cornu of the right ventricle. These were all surrounded by vascular zones.

Microscopical Examination.—The various deposits were found to consist of amorphous, granular opaque corpuscles along with nucleated cells looking almost like epithelium, some having a fibrillated character.

Case CLX. *Fibro-fatty Tumours of the Dura Mater on the* RIGHT *Side of the Skull. Epilepsy and Coma before Death.*—Richard D., aged forty-two, admitted April 24th, 1863. He was described as having had a sunstroke in India, five years previous, and since then had been subject to pain in the head, which for two years had much increased. In August 1862 he had an epileptic attack, followed by severe degree of coma, and since that time had had frequent attacks of epilepsy, in which sometimes one and sometimes the other side of the body was mostly convulsed. For three days before admission he had lain in a half-conscious state, and when in the hospital had several slight convulsive attacks. The urine was not albuminous, but turbid with phosphates. He remained in the same state for twenty-four hours, and then died.

Post-mortem Examination. Cranium: Skull natural. The dura mater was adherent to the right parietal bone by slight false membranes, and over the back of the right cerebral hemisphere, was adherent to the brain. Here a tumour, one inch long, was connected with the inner surface of the dura mater, and projected one inch into the brain, whose substance around was softened. A similar tumour, as large as a tennis-ball, was attached by a narrow basis to the dura mater over the semicircular canal of the right temporal bone, and projected into the right cerebral hemisphere at the junction of the middle and posterior lobes, the brain substance in the neighbourhood being softened. The brain generally was injected. The lateral ventricles were empty and natural as to their walls. *Thorax and Abdomen:* Pleural adhesions and congestion of one lung existed; the mitral valve of the heart was thickened, and there were some old pericardial adhesions; the capsule of the spleen was thickened; other organs were natural. (108.)[1]

Microscopical Examination.—Both the growths in the brain above described were found to consist, on their external parts, of fibro-cellular tissue, with elongated cells, and white fibres in great abundance; and, in their centre, of soft yellowish opaque matter, consisting of oil-globules and granular matter.

CASE CLXI. *Hard Tumour attached to the Inner Surface of the Dura Mater of the Brain.* LOOSE BODY *lying in the* BASILAR ARTERY. *Symptoms like those of Ague. Ulceration of the Cornea.*—Lieut.-Col. W., aged forty-seven, a stout athletic man, and intemperate, having lived much in tropical climates, and having had several attacks of disease of the liver, became intoxicated Sept. 24th, 1824, and on the day following had slight shiverings and uneasiness, and distension of the abdomen. This was much relieved by aperients, but two days afterwards he was attacked by severe rigors, followed by heat and sweating, and inflammation of one eye came on. The rigors and heat and sweating came on again, and it was thought the patient had ague, and was treated with bark and quinine. Much vomiting also occurred, and bloody diarrhœa; restless nights were passed; the face became anxious, the tongue dry, and hiccough and thirst came on, and also diarrhœa with bloody mucus continued. Quinine and opium were given, but exhaustion suddenly came on, relieved by strong stimulants, and was followed by much febrile disturbance. Delirium supervened, and leeches were applied to the temples, and blisters to the head. The cornea of the inflamed eye ulcerated, and the aqueous humour was discharged. Deglutition became difficult; the delirium became violent; the left parotid gland became much inflamed. Subsequently, though the head remained very hot, the skin cooled much. He gradually sank, and died September 19th.

Post-mortem Examination.—Cranium: The inner table of the os frontis was rough, as if from slight exostosis. Much serum existed in the sub-arachnoïd tissues and the ventricles, and the substance of the brain generally was very vascular, and attached to the inner surface of the dura mater; corresponding to the left parietal bone, near its junction with the temporal, was a firm hemispherical tumour of about the size of a walnut, having on section the appearance of the pancreas. The portion of brain pressed on by the growth was natural. *Lying loose in the basilar artery, was a small semi-lunar body of a cartilaginous firmness, and about three lines in diameter;* the artery itself just above the junction of the two vertebral arteries, and below the place where the substance in question was situated, was somewhat dilated, but not otherwise diseased. *Thorax:* Organs quite natural. *Abdomen:* The inner surface of the stomach was marked with bright red streaks, and there was a deficiency of mucus and appearance of "rawness" of the mucous membrane.[1]

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[1] See Hospital Path. Catalogue, Series viii.; also Trans. Path. Society, vol. xv. p. 28, as described by Dr. Dickinson. A fibro-fatty tumour of the dura mater also exists in the Middlesex Hospital Museum, as No. 11*c*, Series v. This was described by Mr. Sibley in the Trans. of the Path. Soc., 1855–6, vol. vii. p. 1.

CASE CLXII. *Hard (most probably Fibrous) Tumour in the Substance of the Base of the* LEFT *Cerebral Hemisphere. Softening and Induration of other parts of the same Hemisphere. Epileptic Attacks following a Fall. Partial Paralysis of all the Limbs.*—Richard P., soldier, aged thirty-one, was admitted into hospital, Feb. 9th, 1822. Two years previously he had had a fall on the head in India, ever since which time he had been subject to epileptic attacks of irregular occurrence. When admitted, he had constant pain in the back part of the head, and complained of vertigo when erect. The pupils were dilated and somewhat inactive; the face was pale; the muscles of the right side of the face slightly wanting in power. The muscles of the right arm and leg were almost entirely paralysed; those of the left arm and leg were also, but in a less degree, diminished in power. This was chiefly the case with the left arm, which was very painful. No febrile symptoms existed, and the tongue was clean. The intellect was unimpaired, and he was apt to doze off, not being easily roused. Obstinate constipation came on (croton oil and other aperients proving ineffective), and he fell into a comatose state, the pupils becoming dilated. In spite of counter-irritants and cupping on the temple, on two or three occasions to several ounces, and also of venæsection, he became worse, febrile symptoms set in, and he became more comatose, and died February 28th.

Post-mortem Examination.—Limbs very rigid; body loaded with fat. *Cranium:* Portions of the external surface of the cranium were very vascular, particularly in the course of the sagittal suture, and in the middle of the occipital bone. Cerebral membranes very vascular. The inner surface of the bone was not vascular, but was roughened, and slightly cellular, as if corroded, and incrusted with a white, opaque, calcareous matter. The medullary substance of the right cerebral hemisphere was somewhat firmer than usual, the walls of its superior cavity being almost in contact, whilst its lower cavity was much distended. In the back part of the posterior lobe of the cerebral hemisphere, and on a level with the floor of the ventricle, was a hard tumour (of about the size of a walnut), adhering firmly to the pia mater, and dura mater, which were here united, and the brain-substance around was so softened as to be of the consistence of coagulated milk. The tumour was of a greyish colour externally, and yellowish internally. It had the appearance of being scirrhous. The greater part of the left cerebral hemisphere was also diseased; the superior part of the anterior lobe being more vascular than usual; and that of the middle lobe was unusually white and firm, being indeed not easily cut with a knife, having a fibrous appearance. The superior part of the posterior lobe was, generally, unusually soft, and more or less approaching the consistence of curd. Cerebellum rather softer than usual. *Thorax:* Much vascularity of the air passages, pleural membranes and lungs. Heart natural; cavities empty. *Abdomen:* A cicatrix-like mark existed on the surface of the liver. Other organs natural.[2]

CASE CLXIII. *Fibrous Tumour in the* RIGHT *Cerebral Hemisphere. Pulmonary Phthisis. Ulceration of the Bowels and Stomach.*—Robert L., aged forty-six, a soldier, and a free liver, was admitted into the Malta Hospital, Sept. 6th, 1841, without positive symptoms of phthisis, but with cough and chronic catarrh. On the 20th of October, he became comatose, and had picking of the bed-clothes; diarrhœa and tenesmus came on; his mental faculties, however, recovered by degrees, and he slowly regained strength. The diarrhœa, unaccompanied by pain, continued, and he gradually sank into a comatose state, and died November 8th.

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[1] I have to thank Dr. John Davy, F.R.S., for details of this case.

[2] Ibid.

Post-mortem Examination.—Cranium: The vessels of the brain and membranes were unusually turgid. The lateral ventricles were extremely capacious, and about half-full of fluid, and the surface of the cerebrum shrunk and shrivelled. In the right cerebral hemisphere, and just anterior to and above the right crus cerebri, was a rounded tumour, of about the size of a boy's marble. This was tolerably firm in consistence, and had a cartilaginous appearance. The brain-substance around was somewhat softened, but otherwise it was generally firm. *Thorax:* Much tubercular matter, and many vomicæ, existed in the lungs. Heart healthy. Ulceration of the epiglottis existed. *Abdomen:* Ulceration of the small intestines existed, and the mesenteric glands were enlarged, and some of them full of scrofulous material. Three small ulcers also existed in the inner surface of the stomach. Other organs natural.[1]

CASE CLXIV. *Fibro-plastic Tumours (so called) of the* LEFT *Cerebral Hemisphere.*—Unfortunately I am not in possession of the history of the following case. I have to thank Dr. Bacon for a description of the growth, which is preserved in the Museum of the S. Maria Nuova Hospital at Florence. The tumour was situated in the upper and middle part of the left hemisphere, its upper part being in contact with the membranes covering the brain, and it much encroached upon the middle, and partly upon the other lobes at the base, flattening the convolutions. It was oval in form, hard and resisting to the touch, and measured 9½ centimetres in its transverse, and 5½ in its vertical diameter, being imbedded in the brain and separated by a thin layer of medullary substance for two-thirds of its size from the lateral ventricle. It was, moreover, surrounded by a cellular membranous envelope, separating it from the brain-tissue, which was natural in all respects.

Microscopical Examination, made at Florence by one of the Professors in that city.—The central part of the growth showed large numbers of fusiform fibres mixed with small spherical and ovoïd globules, having all the appearance of fibres, and fibro-plastic globules.

CASE CLXV. *Fibroïd Tumour connected with the Base of the* FOURTH *Ventricle of the Brain. Similar Growths in the Cerebellum. Disease of One Kidney and Stricture of an Ureter. Diseased Supra-renal Capsule. Partial Paraplegia.*—The patient, a married woman, aged thirty-five, and in the sixth month of pregnancy, had suffered much for two years from severe headache, and during that time had experienced great reluctance to do household work. Six weeks before death she came under observation, and at that time she was much emaciated, and quite unable to walk owing to loss of power in the legs—which, however, did not amount to perfect paraplegia—and in the arms, and passed her urine and fæces involuntarily. Loss of sensibility of the skin was not observed. She could use her arms, and could speak even up to the day of her death, but at times her mind was confused. For some time before death, also, she was the subject of hiccough and vomiting.

Post-mortem Examination.—Thorax: Organ quite natural. *Abdomen:* The pelvis of the right kidney, and also the lining of the corresponding ureter, were much inflamed and dilated, especially the latter, and also contained some purulent fluid. The ureter was also strictured at a point two or three inches from the bladder, the lining membrane of which organ was thrown into deep folds of a dark colour, as if inflamed. Both supra-renal capsules were very unusually tough, and in the right one was a buff-coloured tumour of the size of a small walnut. The pancreas was full of small cysts; the uterus contained a fœtus of about the sixth month. *Cranium:* Bones of skull natural; the cerebral membranes were healthy, but the sub-arachnoid spaces were filled with red

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[1] I am indebted for this case to Dr. John Davy, F.R.S.

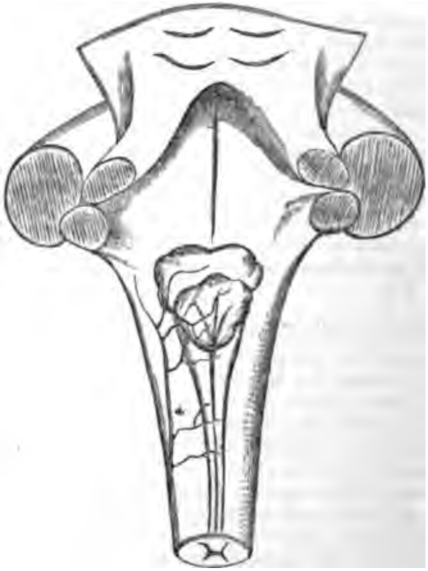

Fig. 9.—Shows the lobulated growth springing from the floor of the fourth ventricle. *a*. Small veins coursing over the arachnoid membrane.

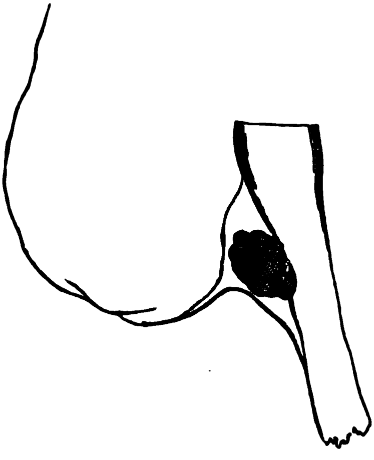

Fig. 10.—Shows a profile view of the same growth connected with the base of the fourth ventricle.

serum, and the vessels of the pia mater were congested. In the fourth ventricle a firm tumour of a reddish colour, and of about twice the size of a pea, having an irregular and nodulated surface, existed. This tumour, as shown in the preceding woodcut (Fig. 9), was found to spring from and to conceal the so-termed calamus scriptorius. Its relation to the parts forming the base of the ventricle may be understood also by reference to the diagram represented in woodcut Fig. 10, which shows a vertical or profile section of the tumour and the medulla oblongata. Over the arachnoïd membrane covering the surface of the growth several veins were found coursing along from the cerebellum towards and merging in a larger vein at the side of the medulla oblongata (see *a* in Fig. 9). One or two similar reddish masses, of the size of a pea, were also met with near the surface of the cerebellum. The spinal cord was not examined.

Microscopical Examination.—This growth was found to consist mainly of old blood-coagula, delicate fibrillated tissue, with here and there nucleated, tapering fibres, some masses of crimson-coloured material, a few scales of *cholestearine;* but the majority of the mass was found to consist entirely of blood-globules. Nothing like nucleated cells, or nuclear bodies, such as are found in carcinomatous material of any kind, was met with.

I have much to thank Dr. Chadwick, under whose care the patient was, for the opportunity of adducing this interesting case, and also Mr. F. Pridgin Teale, jun., for sending me the drawing of the specimen, and forwarding to me the preparation for examination.

Case CLXVI. *Fibrous Tumour connected with the Base of the* FOURTH *Ventricle of the Brain. Epilepsy.*—The patient was a child who died of epilepsy; but unfortunately I possess no further particulars of the case. The position of the growth is well illustrated in the lithographic Plate III. Fig. 6; and its *microscopical* character, consisting as it did of very delicate fibrous tissue, extremely numerous, capacious, ramifying capillaries, along with a granular fibroïd matrix, and much granular material, with a few corpuscles intermixed, is well delineated in the same plate as Fig. 5.[1] For the opportunities of relating this case I have to thank my friend Mr. Bristowe, of Oxford.

Case CLXVII. *Large Round Deposit within the* FOURTH *Cerebral Ventricle. Epilepsy.*—Sarah B., aged thirty, had been subject to fits for two or three years. These had first occurred after great fatigue in ascending a high mountain, and were of uncertain recurrence until within two or three months of death, when they increased in frequency; and at last she had several attacks in the day. The fits came on without any warning, and lasted from two to fifteen minutes, and when they had ceased she was instantly conscious and had her mental faculties quite clear. Head-ache, however, generally followed, and a sense of numbness, especially of the left side of the body. During the fits the eyes were protruded and turned towards the left side, and the pupils were dilated; and there was at times grinding of the teeth, and commonly a movement of the *right* arm towards the forehead, and a disposition to scratch the face. The sight had latterly become impaired, but not so the "hearing," and her catamenia had ceased some months before death. The intellect was remarkably *un*impaired. Before death the patient was troubled with piles, and also with boils on the neck. For one week, during which time she was bled from the arm after an unusually severe attack, and took the nitrate of silver, no fits occurred.

Post-mortem Examination.—*Cranium:* Both lateral ventricles were very greatly distended by about four ounces of limpid fluid, but the septum lucidum was entire and firm. The choroïd plexus was pale and granular. Within the fourth ventricle was a tumour of the size of a large nutmeg, adhering to the wall of the ventricle posteriorly. When detached, the corresponding portion of the cerebellum was found to be softened, and yellow in colour, to the depth of nearly half an inch. The mass forming the tumour in question was inferiorly of the dark colour of coagulated blood; the upper part of the tumour was of a light yellowish hue, almost quite white; and this lighter coloured part was softened, and contained a few fine bloodvessels. On minute investigation the tumour was found to consist of, and to be divided almost equally into, an enveloping and an included portion.

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[1] The preparation exists in St. George's Hospital Path. Cat., Series viii. No. 189.

Microscopical Examination.—The darker-coloured part was found to contain a very large number of blood-corpuscles, but little altered. In the upper, or lighter and softer part, numbers of so-called exudation-corpuscles existed, and a fine molecular tissue, with a few fibres. The brain-substance appeared sound, with the exception of the cerebellum, as above-mentioned.[1]

CASE CLXVIII. *Nucleated Fibrous Tumour connected with the Passage between the Third and Fourth Cerebral Ventricles, and projecting into the latter Cavity. Unconsciousness. Tonic Convulsions before Death.*—Hannah A., aged twenty, a person of generally good health, but sulky and bad-tempered in disposition, after eating a hearty meal of pork, July 22nd, 1863, complained much of abdominal pain, and an hour or two afterwards was found in her bed-room, lying unconscious on the floor, having apparently fallen out of bed. During the night she remained unconscious, and on the day after (the 24th) she was admitted into Guy's Hospital. At that time she was insensible, and in a highly febrile state; and there were general tonic convulsions of the body, the arms and legs being stiffly stretched out, and the fingers and toes curved. There was a general mottling and lividity all over the body, but no maculæ. These symptoms continued until she died on the 26th.

Post-mortem Examination.—*Thorax:* The lungs were congested. *Abdomen:* Organs natural. *Cranium:* The cranial bones were natural, also the cerebral membranes. On laying open the ventricles of the brain a small tumour was found, of the size of a small bean, attached by delicate areolar tissue to the right wall of the iter à tertio ad quartum ventriculum, below the corpora quadrigemina, and so projecting into the fourth ventricle as quite to fill up this passage. It was so slenderly connected with the "iter," that it became detached by a very slight touch.

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[1] I have to thank Dr. Davy for the details of this case. Without stopping here to enter into the consideration of the last and the two previously mentioned cases (Nos. CLXV. and CLXVI.), I cannot pass over the opportunity of observing that I believe them to be of unusual rarity. Indeed, they are, in addition to the case I described as No. CXL., the only cases in which tumours of any kind in the fourth ventricle have been described, as far as I am aware, excepting a case alluded to by Dr. Yellowly in the first volume of the Transactions of the Royal Medico-Chirurgical Society (p. 216); another alluded to by Lieutaud in the second volume of his Historia Anatomico-Medica, Parisiis, 1768 (p. 181), and one described in a past volume of the British and Foreign Med.-Chir. Review. Of these, Dr. Yellowly's case was one (mentioned to him by Mr. G. W. Young), in which convergent strabismus of the *left* eyeball was supposed to have been produced by the tumour which was situated on the *left* side of the fourth ventricle. Lieutaud's case was one described in his Liber Tertius (Læsiones capitis), Obs. 148, as an instance of "cerebrum putre." The patient, after suffering from pain in the head and red scorbutus-like eruption on the skin, died with epileptic convulsions. After death, in addition to the putrid state of the brain, the ventricles were found to be distended with fluid, and in the fourth ventricle were found "duo corpora, quasi glandulosa." Of these no further description was given.

I have met with a specimen in the University College Museum (Y 89, 2275), showing a growth or excrescence of about the size of a pea, and rather flattened, attached to the floor of the fourth ventricle on the left side of the median line. It is now of a brownish colour, but its composition is not described. It is stated that no symptoms of the affection were noticed during life.

Microscopical Examination showed the growth to be composed of delicate nucleated tissue. For the opportunity of relating the details of this case I have to thank Dr. Wilkes, of Guy's Hospital, under whose care the patient was.[1]

CASE CLXIX. *Nucleated Fibrous Tumour connected with the Cerebral Membranes in front of the Left Lobe of the Cerebellum and pressing upon the Pons Varolii. Projection of the Tumour into the* FOURTH *Cerebral Ventricle. Facial Paralysis. Weakness of entire Body.*—Sarah Anne B., aged twenty-eight, had enjoyed good health until about seven months before her death, when she began to experience odd sensations in the head and buzzing in the ears, but had no pain. Her sight began to get dim until she was quite blind. On admission she was quite blind and partly deaf, having also paralysis of the left side of the face. The pupils were fixed and inactive; the paralysis of the face became complete, with a general weakness of the whole body, until at last she could not move from her bed. The intellect remained clear.

Post-mortem Examination.—Cranium: A tumour the size of a bantam's egg was found lying at the base of the brain immediately in front of the left lobe of the cerebellum, and growing apparently from the cerebral membranes. It was of oval shape and much firmer than the brain-substance, consisting of nucleated fibrous tissue. By its pressure it had caused a deep indentation in the pons Varolii, and the seventh nerve was stretched over it. The fourth ventricle was found to be much distorted from the projection of the tumour into it, which caused its walls to be curved around the tumour. Other organs of the body were found to be healthy.

For the opportunity of relating the details of this case I have to thank Dr. Gull, under whose care the patient was at Guy's Hospital. In the Middlesex Hospital museum is a preparation, No. 20, Series v., showing a growth described as of doubtful nature, connected with the posterior surface of the pons Varolii, hanging with a ragged termination down the fourth ventricle and the vertebral canal, composed of cellular and fibrous tissue. In this case no cerebral symptoms appear to have been noticed.

V. CALCAREOUS AND OSSEOUS DEPOSITS IN CONNEXION WITH THE BRAIN AND CEREBRAL MEMBRANES.

CASE CLXX. *Large Mass of Calcareous Matter in the Falx Cerebri. Softening of the Central Parts of the Brain. Phthisis Pulmonalis. Severe Head-ache during Life.*—David E., aged twenty, was admitted Feb. 22nd, 1842, with erysipelas. Pains in the limbs, severe head-ache, sickness, and great unwillingness or inability to answer questions existed, but no paralysis was noticed. The pupils became dilated, the pulse low and slow, and later on there was involuntary action of the bladder. Coma continued until death (March 3rd), erysipelas having appeared on the face towards the end of life.

Post-mortem Examination.—Thorax and Abdomen: The lungs contained much scrofulous deposit; the kidneys were congested. *Cranium:* A large portion of calcareous matter was found in the substance of the falx cerebri, and one of the Pacchionian bodies was unusually large, and imbedded in a cavity which almost penetrated the entire thickness of the skull. The corpus callosum, fornix, and septum lucidum were very softened; and at the base of the brain recently effused fibrine existed in the sub-arachnoïd tissues. (44.)

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[1] The case is also mentioned in the Medical Times and Gazette, May 23rd, 1863, vol. i. p. 536.

CASE CLXXI. *Calcareous or Bone-like Deposit in the Falx Cerebri. Death from Fever.*—Charles C., aged forty-one, admitted Oct. 5th, 1842, owing to a severe and constant pain in the head and limbs of a fortnight's standing. He had never had anything like a fit. Shortly after admission he had symptoms of disease of the lungs and fever, of which he died, the severe pain in the head having continued the whole time.

Post-mortem Examination.—Thorax and Abdomen: Consolidation of the lungs from pneumonia and scrofulous deposit in the bronchial glands were found, also ulceration of the small bowels. *Cranium:* A large deposit of bone-like substance was found in the substance of the falx cerebri, especially at its anterior part; and the ventricles were much dilated. The cranial contents were otherwise natural. (92.)

CASE CLXXII. *Layer of Bone between the Parietes of the Dura Mater at the Posterior Part. Carcinoma of the* LEFT *Cerebral Hemisphere.*—This case has been described as Case CXIII., owing to the carcinoma of the brain, and therefore the details are not now repeated.

CASE CLXXIII. *Calcareous Deposit in Adhesions of the Dura Mater to the Cerebellum.*—William D., aged twenty-six, an intemperate man, was admitted May 4th, 1844, with pleurisy and phthisis pulmonalis. Severe pain in the head existed, much increased by excitement, and a drooping of the eyelids. Convulsions supervened, followed by coma.

Post-mortem Examination.—Cranium: In addition to much fluid in the ventricles and sub-arachnoïd tissues, and great congestion of the brain-substance, the choroïd plexuses were found to contain deposits like scrofulous matter; and the parietal layer of the arachnoïd was adherent to the cerebellum at the posterior and left side, and in the neighbourhood of the adhesions calcareous deposit was found. (111.)

CASE CLXXIV. *Thick Deposit of Calcareous Matter in the Falx Cerebri. Congested Brain. Opaque Arachnoïd Membrane. Death from Pneumonia and Delirium Tremens.*—William V., aged forty-three, was admitted January 2nd, 1846, for diffuse inflammation of the thigh, delirium tremens, and pneumonia. The pupils were natural and active, the urine not albuminous. He died two days after admission, no symptoms referrible to the brain having shown themselves.

Post-mortem Examination.—In addition to the diseased state of the thigh and lungs, much fluid was found beneath the arachnoïd membrane, and this membrane was somewhat opaque; the white part of the brain was congested; a thick patch of calcareous matter was found in the posterior part of the falx cerebri. (4.)

CASE CLXXV. *Extensive Calcareous Deposit in the Cortical Parts of the* RIGHT *Cerebral Hemisphere.*—Harriet A. was admitted into the hospital Oct. 13th, 1847, with a pallid and puffy face, with the urine having a specific gravity of 1017, containing blood and fibrinous "casts," and with anasarca and much epithelium from the bladder and kidneys. It appeared that she had been in good health until about five months previously, when she began to suffer from pains in the loins and debility. Shortly after admission severe fever and rigors and pains in the limbs set in. Subsequently she had much pain at the left side of the chest and abdomen, and twelve days after admission she suddenly lost power of motion and sensation down the whole of the LEFT side, and the next morning she was found almost quite comatose. When roused she always declared she had no pain. Both pupils were dilated and very inactive. The tongue, when protruded, was directed to the left side. Evacuations passed involuntarily. She regained consciousness, but occasionally was affected by drowsiness, and so remained nineteen days, regaining sensibility of skin and some amount of movement in the limbs, and of power over sphincter. The urine fell in specific gravity, and varied from 1002 to 1008. During one night she was suddenly seized with violent general convulsions, followed by complete loss of power in the left side, and by a remarkable immobility of both eyeballs. She died on the day following a fit (November 26th). When the convulsions came on she was treated with purgatives and stimulants, and abstraction of blood from the temples; subsequently, tonics and stimulants and opiates were used.

Post-mortem Examination.—Thorax: One lung was much hepatized, the left ventricle of the heart was thickened, and on the edges and surface of the mitral valve-flap was much fibrinous shreddy material, arranged in pendulous masses, and easily dislodged with the finger. There were extensive pericardial adhesions. *Abdomen:* The kidneys were large, congested, and mottled; and the spleen contained a large block of fibrin in its substance. *Cranium:* The bones of the skull and the cerebral membranes were natural. A large part of the *right* cerebral hemisphere was in a very softened and broken-down state; and in the cortical part of this hemisphere, corresponding to the softened portion, was a mass of calcareous substance about two inches in length. The grey substance of the brain immediately around this was not perceptibly softened or altered. Two other, but smaller, calcareous masses were found also in the cortical part of this hemisphere at a more anterior and inferior part of the organ, and there was a slight amount of calcareous matter on the surface of the right corpus striatum. The cranial sinuses and vessels were natural.[1] (239.)

CASE CLXXVI. *Calcareous Deposit in the Falx Cerebri. Exostoses from the Inner Surface of the Os Frontis, and Absorption of Dura Mater. Absence of Cerebral Symptoms.*—James P., aged forty-two, admitted December 5th, 1849, owing to an abscess under the axilla, of several months' standing, and sinuses. He had anasarca, albuminous urine, pleurisy, and pneumonia, and sank and died January 1st, 1850. No cerebral symptom had ever existed, as far as was known.

Post-mortem Examination.—Thorax: Indications of pleurisy, peritonitis, pneumonia, and diseased kidney existed. *Cranium:* The calvarium was thick and dense, and the diploë undistinguishable from the cancellæ of the bone. On the inner surface of the os frontis, near its centre, were four rough, irregular, blackish exostoses, each of them about the size of a fourpenny-piece. They were situated two on either side, and near to the median line, one above the other. The dura mater corresponding to these bony growths was removed by absorption. The Pacchionian bodies were numerous and large, and the dura mater covering them thin, and in some places pierced. The anterior part of the falx cerebri presented a cribriform appearance, and in its substance was developed a small bony growth of about the size of a grain of pearl-barley. The brain was very moist, but otherwise natural. (3.)

CASE CLXXVII. *Calcareous Deposit in the Substance of the Cerebral Arachnoïd Membrane. Atheromatous and Calcareous Deposit in several parts of the*

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[1] See Hosp. Path. Cat., Series viii. No. 46; also Beale's Archives of Medicine, vol. i. p. 187.

Arterial System. Death from Coma following Acute Rheumatic Fever and Diseased Heart and Kidneys.—George B., aged forty-five, admitted April 7th, 1852, having suffered rheumatic pains for several weeks, and for years been subject to them, with acute rheumatic fever. He was treated with salines, alkalies, aperients, and opium. He was subsequently bled at the arm twice. On the 10th some indistinctness of articulation was noticed, and subsequently severe epistaxis, with confusion of intellect and difficulty in articulation. He gradually fell into a comatose state, and died May 4th.

Post-mortem Examination.—Thorax: The heart was very large, and the walls of its left ventricle thickened. The mitral valve edges were thickened, and the root of the aorta contained calcareous deposit, and the coronary arteries were very atheromatous. The abdominal aorta a little above its bifurcation presented a *round patch* of ulceration, filled with putty-like material and soft coagula. This passed also under and among the neighbouring arterial tissues. *Abdomen:* The kidneys were highly granular; the spleen was softened. *Cranium:* The inner surface of the calvaria presented several depressions at the vertex, like those co-existing with enlarged Pacchionian bodies; the visceral arachnoïd was slightly thickened and tough, and much clear sub-arachnoïd fluid existed. At one point, about an inch from the median line and at the upper part of the right cerebral hemisphere, was a small deposit of *bone within*, and blended with, the arachnoïd membrane. This corresponded with a cribriform condition of the dura mater, and a slight depression on the internal surface of the skull; otherwise, the membranes of the brain and the organ itself were natural. There was much clear fluid in the cerebral ventricles, and their septum was perforated by an oval, even orifice. (108.)

CASE CLXXVIII. *Calcareous Deposit in the Falx Cerebri. Atheroma of Arteries. Diseased Kidneys. Delirium Tremens. Coma before Death.*—William M., aged fifty-four, admitted December 8th, 1852, in a state of delirium tremens, several attacks of which he had had previously. He became comatose, and died on the second day after admission.

Post-mortem Examination.—Thorax: The heart was enlarged and softened in texture; fibrinous masses were adherent to the corpora Arantii of the valves. The coronary arteries were somewhat atheromatous; the lungs were very congested. *Abdomen:* The kidneys were highly granular, and occupied by yellow specks of deposit in places. The capsule of the spleen was opaque and thickened; atheromatous deposit existed in the walls of the branches derived from the aorta. *Cranium:* Much fluid existed in the ventricles of the brain and the sub-arachnoïd tissues. The larger cerebral arteries were slightly atheromatous; the brain was generally of rather diminished consistence. In the posterior part of the falx cerebri was a mass of calcareous material, of a considerable size, but it did not appear to have in any way affected the brain. (240.)

CASE CLXXIX. *Calcareous Matter within the Substance of Fibrous and Scrofulous Matter deposited in the Upper and Middle Part of the* LEFT *Cerebral Hemisphere. Delusions. Partial Paralysis. Misapplication of Words. Epilepsy. Phthisis Pulmonalis.*—F. G., aged thirty, was admitted into St. George's Hospital, September 19th, 1854, having been the subject of attacks of difficulty of speech, attended by a curious sensation in the throat, and numbness and coldness in the right hand. He had also had an attack in which he lost strength throughout the body, and had "ringing through the head," and "flashes of fire" in the eyes, and at times he quite lost all sight. When admitted, there was divergent strabismus of the left eye, and both pupils were dilated, their edges being uneven. He stuttered much in speaking, and at times his speech and sometimes his sight quite failed. The muscular power generally was impaired. After a period of between five and six months he got worse, and then lay unconscious in bed for ten weeks, only replying "yes" or "no" to questions, and passing evacuations involuntarily. In March, 1855, he had an epileptic attack, the muscles of the limbs on the RIGHT side of the body only being convulsed. The eyeballs became very prominent, and in speaking he would repeat parts of words and also often leave words unfinished. He would often open his mouth when told to shut his eyes, and got it into his mind that people were speaking and telling lies about him, and would often pretend to be reading when he was not. In April he had another epileptic attack, and afterwards, though he understood things better than before, would mispronounce words grievously. The left pupil became dilated and immovable, and he became blind of this eye. He fancied parts of the floor of the ward were lower than others, and that in trying to read, some words dropped below others. Pain in the head came on, and a feeling as if he had things loose in it. There was also a feeling of coldness, and a curious feeling in the right arm and leg, but the skin was not really diminished in temperature. As an example of his mispronunciation of words, he would call candle "carsel," and straight "strain," and medicine "messin," and called "caused." No albumen was found in the urine. In September, another convulsive attack came on; the sight of the *right* eye became dim, and he began to complain of twitchings in the right arm and hand, and of pain in them. Pain also in the head, and specially the left side, became worse. A swelling at the back of one arm formed and became an abscess, and subsequently a similar one appeared over the sternum. In February, 1856, cough and pain in the left side, and dulness on percussion over left lung, came on; and in May, a series of convulsive attacks came on, and later on the mouth was drawn to the right side in speaking, and the tongue protruded to the left. He died in a convulsive attack, June 23rd, 1856. Throughout his illness there had been no vomiting. The treatment consisted in the use of tonics and small doses of bichloride of mercury, and the application of a seton to the neck; stimulants and nourishing diet.

Post-mortem Examination.—An abscess was found in connexion with caries of the third and fourth ribs on the right side near the sternum. *Thorax:* Much scrofulous deposit existed in both lungs. *Abdomen:* Organs natural. *Cranium:* The skull-bones were very thinned and softened, and many bony projections and elevated ridges existed on the inner surface of the calvarium. The dura mater was adherent to the brain at the upper and outer part of the left cerebral hemisphere by means of a callous, fibrous, cicatrix-like deposit, containing yellow firm material of the size of half a pea, along with a quantity of calcareous substance. The entire mass penetrated into the brain-substance, which was much softened around. The arachnoïd membrane generally was thickened and opaque, and much subarachnoïdean fluid existed.

Microscopical Examination.—Much fatty matter was found loosely distributed in the brain-substance around the deposit and the brain-cells, and the walls of the capillaries were occupied by fatty globules. Moreover, the brain-substance was deficient, and appeared to have given place to a growth of very delicate fibrous tissue, probably an increase in the matrix of the organ. The cicatrix-like mass consisted of spindle-shaped cells in fibrous tissue, with amorphous and fatty matter, and several corpuscular elements of irregular form; also a few cholestearine cystals.[1] (148.)

CASE CLXXX. *Calcareous Mass connected with the Visceral Arachnoïd Membrane covering the Brain, &c. Fractured Ribs. Ecchymosis and Softening*

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[1] This case has been related at greater length, and with all details, in Beale's Archives of Medicine, vol. i. p. 81.

of the Spinal Cord from Injury.—Peter O. H., aged sixty-one, admitted September 21st, 1857, with fracture of the left radius and certain costal cartilages, owing to a fall which also produced ecchymosis of blood into the lower part of the cervical region of the spinal cord, without any injury to the bones of the spine. When admitted, the right pupil was much larger than the left, and there was loss of power and diminished sensibility of the skin of the right arm. Symptoms of bronchitis came on, and delirium followed, the pupils remaining tranquil. He sank and died on the 29th.

Post-mortem Examination.—In addition to the ecchymosis of the spinal cord before mentioned, the lower part of the cervical region of the spinal cord was softened, and the white portion had a pinkish hue. *Thorax:* The lungs were congested. The heart was flabby, and the tricuspid valve-flaps thickened, and fibrinous masses were attached to the mitral valve-flaps. *Abdomen:* The various organs were natural except that in the right supra-renal capsule was a cyst of the size of a large marble; the substance of the organ being apparently natural. *Cranium:* The brain was wet. The Pacchionian bodies were large, and a mass of calcareous material was found on the visceral surface of the arachnoïd membrane. The brain was otherwise natural. (234).

CASE CLXXXI. *Bony Plate in Falx Cerebri. Acute Rheumatism. Abscess in the Hip-joint. Pyæmia.*—Henry P., aged thirty-eight, admitted Nov. 30th, 1859. Having been in good health, and a temperate man, he was affected two weeks before admission with pains in the right knee and groin, thought to be rheumatism. On admission, the knee was exquisitely painful, but little swelled. Salines and calomel and opium were given. On the day after admission he became delirious; the urine was found to be albuminous, and to contain "casts." He became better, free from pain and delirium, but profuse sweating came on, and also intermission of the pulse. He rather unexpectedly died five days after admission.

Post-mortem Examination.—*Abdomen and Thorax:* The kidneys were diseased, one containing a "secondary deposit," and the lungs contained similar deposits. *Hip-joint:* The right hip-joint was full of sanious pus, and the cartilage of the acetabulum much diseased. *Cranium:* A large bony plate was found in the substance of the falx cerebri; but nothing further of an unusual character was found about the cranium or the brain. (260.)

CASE CLXXXII. *Thick, Irregular Plates of Bone in connexion with the Dura Mater, covering both Cerebral Hemispheres and the Falx Cerebri. Phthisis. Diseased Kidneys. Confusion of Thought, and Delirium before Death.*—Jonathan S., aged forty-seven, was admitted May 27th, 1863, with phthisis pulmonalis. He eventually lapsed into a stupid, confused state, and then delirium came on. He died June 15th.

Post-mortem Examination.—*Thorax and Abdomen:* In addition to the disease of the lungs, the kidneys were slightly diseased. *Cranium:* The bones of the skull were natural. The arachnoïd generally was thickened, and much fluid existed in the ventricles and sub-arachnoïd tissues. Along each side of the superior longitudinal sinus were a number of plates of bone of an irregular shape and of considerable thickness. Some of these bony masses were attached to the dura mater upon the cerebral hemisphere, whilst others were attached to the falx cerebri. (150.)

CASE CLXXXIII. *Bony Deposit in the Arachnoïd covering the Brain. Brain Congested. Hemiplegia on the Left Side.*—Richard F., aged twenty-eight, admitted June 13th, 1864. Confirmed drinker for six or seven years. On the day of admission he suddenly felt numbness and pain in the left hand whilst putting on his boots, which ascended to the left shoulder, and was then followed by total loss of power of the left arm and slight anæsthesia. Whilst in hospital, and before going to bed, fell down in an epileptic fit, but became conscious afterwards, and vomited. Later on he had another fit, when he foamed much at the mouth. Calomel aperients and a blister to the nape of neck were ordered. One or two more fits came on, followed by chattering and laughing, which lasted all night, and in the morning he became livid. Convulsions preceded death, which occurred on the 15th. (162.)

Post-mortem Examination.—Cranium: Vessels of dura mater very distended. Two small patches of bone attached to the visceral arachnoïd near the longitudinal sinus. Brain very vascular. Very much fluid in the ventricles and beneath the arachnoïd. *Thorax:* Extensive pulmonary apoplexy. Thickening of aortic and mitral valves. *Abdomen:* Liver fatty, with thickened capsules. (52.)

In addition to the cases of bony or calcareous matter connected with the cerebral membranes which I have before adduced, we possess in our hospital museum several other specimens having no history leading to suspect cerebral symptoms in connexion therewith (ranging in all from Nos. 92 to 97 inclusive, of Series viii.). These deposits are chiefly in connexion with the dura mater, and especially with the falx cerebri. Of these, some distinctly show the formation of these deposits between the component parts of the membrane, as may be seen in the accompanying woodcut, Fig. 11, which also shows by the elevations and depressions on the deposit how its surface has been moulded in adaptation to the surface of the cerebral convolutions.

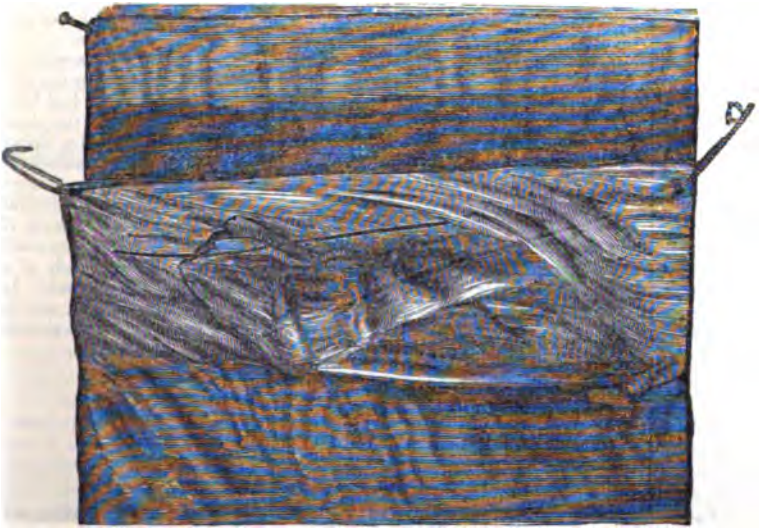

Fig. 11.—Showing the formation of bony matter between the layers of the falx cerebri. A bristle is passed at one part between the bony substance and the investing lamina of dura mater.

Microscopical Examination of the structure of this individual specimen shows it to contain real bone-tissue with Haversian canals, canaliculi, &c., as may be seen in Fig. 1, in the lithograph plate No. III.

I have purposely omitted to include in the above category any special notice of instances of such slight calcareous deposit as have been met with in our hospital post-mortem examinations, in small patches connected with the visceral cerebral arachnoïd membrane, analogous to such as are found in some cases in connexion with the spinal arachnoïd.[1]

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[1] In the pathological department of the new museum at Oxford is a specimen showing a quantity of bone-like material in the falx cerebri. In this case there was also a clot of blood in the neighbourhood of the deposit, and much softening of the brain-substance; also considerable disease of the walls of the basilar artery. The patient had cerebral symptoms during life, and was under the care of Mr. Dixon of Wallington.

In the Middlesex Hospital Museum, Series v., Nos. 1, 1*a*, 1*c*, and 1*d*, show osseous growths in the dura mater. Of these the latter was described by Mr. Flower in the Path. Soc. Trans., vol. viii. p. 26, and is a remarkable specimen of the kind.

In the Guy's Hospital Catalogue is a specimen (1575,^{30}) showing an irregular mass of bone, of the size of a hazel-nut, imbedded in the brain near the surface, probably connected originally with the dura mater, removed from a man aged fifty, who died shortly after the removal of a cancerous tumour from the neck. And also a specimen (No. 1588,^{32}) showing a mass of bony matter of the size of a horse-bean in each choroïd plexus. A specimen in the museum of the Royal College of Surgeons (No. 2092) shows osseous matter in a portion of indurated pia mater. This was removed by Mr. Hunter from the body of a man aged sixty-five, who had a large cyst or collection of fluid on the surface of the right hemisphere of the brain, and penetrating into its substance almost as far as the cavity of the ventricle, and who had had hemiplegia on the left side, following a fit.

In the St. Bartholomew's Hospital Pathological Museum are also four specimens (Nos. 46, 53, 54, and 84 in Series VI.) of bone-like substances removed from the falx cerebri, two from epileptic patients, and one from a man who from boyhood had been subject to head-aches; and one specimen (No. 35) showing the lining of the dura mater to a great extent by bone-like substance. No. 20 in the same series shows the cerebellum occupied by a firm whitish material, having specks of substance like bone scattered through it; and No. 37 shows a small conical bone-like tumour which apparently originated in the pia mater, and had penetrated between the cerebral convolutions. In King's College Path. Museum, No. 757 shows a bony tumour of the dura mater of the size of a Spanish nut, imbedded in the brain substance; and No. 755 shows a small ossific deposit in the pia mater removed from the body of a young woman, who for three years had been subject to choreic convulsions. In St. Mary's Hospital Museum, G. *a*. 7 shows bony spicula of the dura mater, but no history exists; and in the Museum of University College, specimens Y, 18 and 19 (435 and 2413) show ossification of the dura mater, no history being attached.

(*To be continued.*)

*** The Lithographic Plates illustrating various cases in this communication will appear in the next number of the Review.

PART FOURTH.

Chronicle of Medical Science

(CHIEFLY FOREIGN AND CONTEMPORARY).

HALF-YEARLY REPORT ON MICROLOGY.

By J. F. Streatfeild, F.R.C.S.
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Part I.—Physiological Micrology.

Organic Structure as Illustrated by Means of Dyes.—Mr. Abbey thus gives his own conclusions, as differing from those of Dr. Beale:

"1. The germinal matter, so-called, consists of two parts—the one dyed by carmine, the other not so.

"2. It is not possible to demonstrate by means of dyeing agents the gradual transition of living matter into dead matter.

"3. The varying tints of the dyed nucleus are due to the greater or less dispersion of coloured molecules through the uncoloured substance, their close aggregation forming the nucleolus.

"4. The uncoloured portion of the 'germinal matter' is the product of the coloured portion.

"5. Nutrition is least active in the most deeply coloured part of the 'germinal matter.'"—*Quarterly Journal of Microscopical Science*, Oct. 1864, p. 272.

On the Comparative Size of the Blood-Corpuscles of different Animals.—Dr. Crisp, at the last meeting of the British Association, read a paper to show that the largest animals in the same family have not always the largest blood-corpuscles. Examples from among the quadrumana, cheiroptera, *carnaria*, rodentia, &c., were quoted: "It was a curious fact that all the mammals with large blood-corpuscles might be called aberrant, such as the elephant, capybara, and great ant-eater." Birds, reptiles, and fishes were quoted in proof of the same fact. The question whether the size of the corpuscles was smaller in animals of higher organization and greater powers of endurance was negatively answered by various examples quoted.—*Medical Times and Gazette*, Sept. 24, 1864, p. 336.

Blood Crystals.—Thus described by Dr. Harley:

"1. *Hæmin.*—These crystals were made by chemical reagents, and were first obtained by Teichmann by acting on blood with glacial acetic acid. These were short, narrow prisms, and generally broken transversely at their ends. They were of a dark brown colour.

"2. *Hæmatoïdin.*—These were always pathological, and were found in old apoplectic clots, and their appearance was always definite. They were distinguished from hæmin crystals by being broader and of a pale red colour.

"3. *Hæmatin.*—In healthy blood it was possible easily to obtain crystals of hæmatin by dissolving a little in ether and then evaporating. These crystals are much larger than the others; they might be coloured or colourless. It was convenient to call them hæmatin, as they were not pathological, although their composition was not strictly that of the hæmatin of the blood-corpuscles."—*Medical Times and Gazette*, Oct. 22, 1864, p. 448.

Origin and Arrangement of the Superficial Branches of the Lymph-Vessels in the Liver.—Dr. Carter, at the last meeting of the British Association, read a paper to show chiefly that there is a direct communication between the capillaries and the finest lymphatic vessels in the human liver and in the liver of the pig. The author stated that in six instances he had been able, by throwing into the portal vein a transparent blue injection, and into the hepatic vein a red one, to fill and display the lymphatics covering the surface of the organ, there being nothing like ordinary extravasation anywhere visible to account for the phenomenon. In certain parts of the pig's liver the larger lymphatic trunks which surround the lobules were observed to be filled with blue injection, while the capillaries and finer lymphatics upon the surface of the lobules were filled with the red. Moreover, in favourable sections, exceedingly minute injected processes might be seen coming off from the hepatic capillaries and uniting with others to form a primary lymphatic radicle. He had also made similar observations in sections taken from the human liver.

In the second part of the paper was described the peculiar relation which exists between the superficial branches of the hepatic artery and the lymphatics. In the pig each branch of this vessel is accompanied by two lymphatic trunks, which run parallel and in contact with it, and are, as it were, braced together here and there by short transverse branches which pass both above and below. In this way the hepatic artery is more or less ensheathed in lymphatics. In the human subject this arrangement reaches a much higher degree of development, the hepatic artery being, in fact, enclosed in a fenestrated lymphatic tube.—*Medical Times and Gazette*, Sept. 24, 1864, p. 335.

Epithelium of the Pulmonary Vesicles.—Dr. Chrzonszczewsky attributes the differences of opinion on this subject to the different methods employed by observers. Those who deny the existence of epithelium have adopted the methods most likely to secure its disappearance. The author has, after many trials of the various other ways, followed this plan: he inflates fresh lungs, uses a sized injection for the vessels, and immediately puts the preparation into a silver solution of $\frac{1}{20}$th to $\frac{1}{2}$ to 100 parts of water; he lets it remain eighteen to twenty-four hours, and then hardens with alcohol. The sections are coloured with a carmine solution, and are examined in glycerine slightly acidulated with acetic, or, better, with tartaric acid. One then sees, in the clearest manner, the epithelial cells of polygonal form lining continuously, without any interruption, the bottom and the walls of the alveolar spaces. These cells are very apparent, and their nuclei often coloured of a dark brown. The author gives an excellent drawing of one of his preparations, magnified 500 diameters.—(Wurzburger Medicinische Zeitschrift) *Gazette Médicale de Paris*, Oct. 15, 1864, p. 642.

Sarcolemma.—Dr. Beale says many insects show it better than vertebrate animals. In the latter, some muscles seem to have no sarcolemma—e.g., those of the heart and tongue. It is most distinct in *old*, fully formed elementary fibres of muscles having two distinct points of attachment. In some animals the sarcolemma seems to be entirely destitute of nuclei; in others a vast number of nuclei exist. The nuclei in connexion with it have different origins. The nuclei seen upon the surface of the elementary fibres are, for the most part, of vessels and nerves. The author rejects Kühne's method whereby an appearance is seen of little collections of nuclei upon or beneath the surface of the sarcolemma, at which nuclei dark-bordered fibres often appear as if they ceased. Sometimes the nuclei may be stripped off from the surface of the sarcolemma with the vessels and nerves to which they belong, leaving this membranous tube clear and almost destitute of any nuclei whatever. The sarcolemma is continuous with the intermuscular connective-tissue which invests the muscular fibres which have no true sarcolemma. There is most intermuscular connective-tissue when muscles are wasted or degenerated, in old age, &c. Sarcolemma is continuous with the connective-tissue between the bundles of fibres of the tendons of the muscles. The nuclei of the intermuscular connective-tissue often appear then as if they were nuclei of the sarcolemma; and again, nuclei, originally belonging to the contractile tissue, in consequence of its wasting, often appear to be embedded in the thickened sarcolemma. Nuclei found in intimate relation with the tissue of the sarcolemma are nuclei descended from the very same nuclei as those from which the muscular tissue itself has been produced. The author then relates the result of some peculiar preparations of the sarcolemma of the muscles of insects. From these observations he concludes that nerves are distributed over every part of the surface of the sarcolemma. There is no evidence of the nerve penetrating into the interior of the sarcolemma; but, on the contrary, by careful observation of preparations properly prepared, with the aid of very high powers, the finest fibres may be focussed upon the surface of this membrane.—*Quarterly Journal of Microscopical Science*, October, 1864, p. 94.

Muscular Tissue.—Dr. August Weismann is of opinion that there are several kinds of contractile tissue, and by way of proof of this he "has endeavoured to show that the muscles of all evertebrata, with the exception of the arthropoda and protozoa, are composed of cells which entirely unite into a tissue in the same manner as this is known of the 'organic muscles' of the vertebrate animals. It was therefore evident that this could no longer as hitherto pass for a link between the 'organic muscle-cell' and the primitive bundle, and that, inasmuch as there were wanting transitions between the two histological elements, the contractile tissue of the primitive bundle was clearly to be separated from that of the muscle-cells, and both to be retained as particular tissue types.

"If the relations of tendon and muscle must be considered as fixed, the existence of two absolutely different types of contractile tissue appears to me to be as certain. . . . . In my own experience and that of others, *the prevalence of both tissues* could be pretty exactly defined in the circles of the animal kingdom. If we add the protozoa, contractions of the animal body or of its parts may be composed in three different conditions; once by a contractile mass which has not entered into the formation of tissues, although it may assume determinate forms (muscle streaks in the back of the stentor, of Trachelius ovum, Paramæcium); *Oscar Schmidt's formed and unformed sarcode.* According to the present state of our knowledge, it is only found in the circle of the protozoa, but here exclusively represents the muscular tissue of the higher animals. This latter appears in two forms, as *cell-tissue* and as *primitive bundle-tissue.* The cell-tissue is found in all animal circles, with the exception of the arthropoda; a contractile mass enters into its formation; sometimes it is distinctly cross-streaked, and at others 'smooth'—that is, without visible differentiation—whilst the primitive bundle-tissue exclusively belongs to the two circles of the vertebrata and arthropoda, and, as far as we know, its contractile substance is always cross-streaked."—*Zeitschrift für rationelle Medicin*, vol. xxiii., 1864, pp. 26-45.

The Mode of Termination of Nerves of the Muscles.—After a comparative review of this subject, W. Krause takes into consideration the motor end-plates of the higher vertebrata and of man. He says—not considering the evidence to be obtained by chemical means, it is an important circumstance that the membrane, which covers the finely-granular substance of the end-plate, contains nuclei. The difference between these nuclei and those of the sarcolemma has been remarked by all observers, but all have not noticed that the nuclei are situated in the connective-tissue membrane of the end-plate. Nevertheless, it is only an optical deception, arising from the want of true profile views, if some of the nuclei seem to lie in the finely-granular substance of the end-plate. One cannot possibly lay claim to a membrane for a part of the sarcolemma distinguishing itself by an abundance of nuclei, as otherwise they are nowhere present in the sarcolemma.

With regard to the nature of the nuclei in question, all the nuclei of the end-plates appear clear, with nucleoli, and never granulated if we look at them on the surface and examine fresh muscles without anything being added to it. In very rare cases, we find the muscular fibre accidentally torn off just where the end-plate is situated. If the latter did lie in the interior of the sarcolemma, we should be able to observe the finely-granular substance, and the nuclei of the end-plate issuing from the tube of sarcolemma, or at least be able to force it out by pressure, together with the syntonin. Neither is the case, but, on the contrary, the sarcolemma, where the end-plate is fixed, is to be seen particularly distinctly. The finely-granular substance of the end-plate is enclosed between two membranes, the inner one is the sarcolemma, the outer one the connective-tissue membrane of the end-plate.

Through all the attacks hitherto made upon it the thesis has been finally still more established—*that all motor nerve-fibres terminate with end-plates.*

Schönn has found that in the river crab and in the pig a pale terminal fibre (axis cylinder) formed the continuation of the nerve-fibre in the finely-granular substance of the end-plates. This confirmation of my earlier statements is so much the more agreeable, as Schönn had never read my communications.—*Zeitschrift für rationelle Medicin,* vol. xxiii., 1865, p. 157.

Termination of Motor Nerves.—M. Kühne has read a paper on this subject before the Paris Academy of Sciences. He says: "In all the animals in which the muscles are furnished with a nerve colline, one finds at the terminal part of the nerve the same substance, composed of a mass of granular matter and true nuclei. The form of these masses varies with that of the colline de Doyère. In insects, these masses even resemble long striæ in a direction parallel to the axis of the muscle. But this substance is not as, with M. Rouget, we have all hitherto thought, the direct continuation of the *cylinder axis,* for it is only a kind of envelope to the latter. The cylinder axis does not change into this substance, for it is this substance which covers the true termination.

The nervous cone hitherto described as the terminal plate of the nerve is only the envelope of another plate, which is the real continuation of the cylinder axis. This second plate is very nearly transparent, and consists of a sort of enlargement of the cylinder axis. It has rather irregular edges and numerous folds. It is only in quite fresh muscles that it can be seen in this state. At the moment when cadaveric rigidity begins, the plate loses its form, becomes covered with irregular lines, and divided into more or less rounded masses. The same changes take place when one adds a very small quantity of a diluted acid.

The granular matter of the colline de Doyère and these nuclei line almost entirely the lower face of the plate, but there are always some points at which the plate can reach directly the striated muscular substance. This mode of termination may be very well observed in the grey and green lizards, in serpents, rabbits, cats, and in the muscles of any member of the human body recently amputated."—*Archives Générales de Médecine*, 1864, vol. ii. p. 114.

Termination of Motor Nerves in Crustacea and Insects.—M. Rouget objects to the resemblance, said by M. Kühne to exist between the observations of M. Rouget on the higher vertebrata, and the older observations of Doyère on some of the articulata, that it does not at all correspond to the facts he has adduced. From researches that he has lately made on the subject, it is proved undoubtedly, that the modes of termination of motor nerve-fibres in vertebrata and articulata are not identical. Whilst in the articulata and inferior vertebrata the cylinder axis presents no change either of appearance or structure at the level of its termination, in the three higher classes of vertebrata the cylinder axis opens out in the form of a finely granular plate, with a peculiar agglomeration of nuclei. Only one distribution is common to all these modes of termination; the essential element of nerve-fibre always penetrates the sarcolemma to the bundle of muscular fibrils, and the substance of the cylinder axis is in immediate contact with the contractile substance, without being confounded or continuous with it.—*Archives Gén. de Méd.*, 1865, vol. i. p. 103.

Sympathetic Cervical Ganglia.—Of various transverse and longitudinal sections made by M. Duchenne (of Boulogne), he remarks that very few of the cells are apolar; that they generally are connected laterally one with another by a prolongation; that seen longitudinally they are multipolar, mostly bipolar; that in longitudinal section the cells of the different groups are generally connected by prolongations from their extremities, so as to form little centres composed of cells bound together; that the prolongations of the cells are enclosed in a sheath; that transverse sections show masses of nerve tubes in many bundles, principally at the level of the outer border of the ganglion, where they band, sometimes occupying more than a third of the circumference of the ganglions; that between the cells one sees also a great number of nerve tubes much resembling the nerve tubes of which we are about to speak; and that in the smallest as in the largest of these nerve tubes, one sees perfectly the cylinder axis separated in outline by the myeline; that the superior ganglion and the inferior and middle ganglia, show the following different structural characteristics.

A. The cells of the inferior and middle ganglia in their contents generally only show a nearly central nucleus with a nucleolus. Some show also one or two smaller nuclei. All are more or less pigmentary, in one or more points near to the circumference of the contents, and sometimes throughout the whole cell. When they show them, one only sees one or two of them, their prolongations have the characteristics of the cylinder axis, and are not interrupted by nuclei. The tissue in which the cells are strewn is uniformly simple. Thus, in transverse sections the nerve fibres show their cylinder axis and myeline, and in longitudinal sections also they show the ordinary characteristics of nerve fibres.

B. The structure of the superior cervical ganglion is much more complex, chiefly because of the great number of rounded or lengthened nuclei which invade the nervous elements. The contents of the cells have, as in the inferior and middle ganglia, a nucleus with a nucleolus, but this nucleus is generally surrounded by a great number of little nuclei which even encroach upon the sheaths of the cells which take the place of pigmentation, or, in general, hide it. The prolongations of these cells resemble chains formed of little nuclei. Finally, the ground in which the cells are strewn is composed of a great quantity of lines which have almost the same appearance as the prolongations of the cells, due chiefly to a crowd of oval nuclei, lines which also seem to form little chains.—*Gazette Médicale de Paris*, Jan. 28th, 1865, p. 60.

Structure of Nervous Tissue.—Dr. Roudanovsky makes his sections of the nervous substance, when frozen, with a double-edged knife; colours them with a watery solution of cochineal, and then covers them with Canada balsam. He says that, in transverse section, the primitive elements of the nerves are pentagonal or hexagonal tubes. Their walls of connective-tissue appear as a network, leaving in some places, between the tubes themselves and between the bundles of tubes star-shaped closed cavities (reservoirs), by which the nutrition of the nervous elements is effected. The isolation of nerve-tubes is an artificial phenomenon. The cylinder axes, as well as the walls of the tubes, are coloured by cochineal. The cylinder axes are seen in the centre of the tubes as knotty fibres. The cylinder axes give off transverse fibres, which pass through the walls and communicate with similar fibres of other cylinders. In the length of a cylinder axis the transverse fibres of a section of the cylinder axis are given off at nearly equal distances. The transverse fibres are found in the anterior and posterior roots of the spinal nerves, but, perhaps, they are wanting in some nerves. The cylinder axes are surrounded in the nerve tubes by the white substance, which is hardly ever coloured by cochineal, and which in Canada balsam preparations always appears as an amorphous granular mass. In the composition of a bundle of tubes enter large, and fine, and finest tubes. Of the fine and finest tubes the number varies in the different nerves and in their different bundles. They are found particularly in the posterior roots of the spinal nerves, and have the same structure as the large tubes with their cylinder axis. The fine and finest tubes very probably belong to the brain, where they are the predominating, if not exclusive, elements of the white substance. Every nerve contains at once an anatomical substratum of the brain, of the spinal cord, and probably of the ganglions.

In fine sections the grey substance always appears diaphanous, and of a yellowish-grey colour, due particularly to the absence of myeline, giving a dull appearance to the white substance, of opacity. In preparations made with gelatine the myeline appears as fat drops, or sometimes as granular drops. The grey substance of the central organs is composed of cells and nerve fibres like their prolongations or branchings; the white substance of tubes with the characters of those in the nerves. The nerve cells should, without doubt, be considered as the origin of the nerves. They differ in size and shape, in having or not having prolongations, and in the number of the latter. In some parts of the central organs the nerve cells unite by some of their prolongations, thus forming a mesh, at the angles of which are the nerve cells themselves, and thus forming the network of nerve cells. In many parts of the central organs, the tissue of the grey substance shows meshes formed exclusively of nerve fibres, forming a network of the fibres. On the surface of the optic thalami, these bundles of fibres bend in opposite directions, forming a special arrangement of the meshes, as a network of the knots. Meshes or network of grey substance are an essential characteristic of the central parts, as much as a differing direction of the bundles of the fibres of the grey substance, and of the bundles of nerve tubes of the white substance. From this it follows, that some of the nerve fibres of the grey substance curve or bend in the white substance in which they appear as the cylinder axis in the tubes of this substance. In nearly all the spinal cord the general law of the structure of the central organs is observed, the fibres of the grey substance being in opposite direction to that of the tubes of the white substance. The nerve cells communicate by some of their prolongations in the group in which they are found, whether in the posterior or in the anterior cornua. Some of the branches of the nerve cells, passing transversely to the axis of the spinal cord, bend inwards and become parallel to this axis, and go to form cylinder axes in the tubes of white substance. There are nerves which leave the central parts of the brain and spinal cord, as tubes and others that are not so.

In cats, dogs, and rabbits the alterations produced by poisoning by nicotine were indicated by the extreme pigmentation and destruction of the nerve cells, and their prolongations only in the spinal cord where the vagus and hypoglossal nerves arise. The reservoirs also increase in size. Death is effected not only by chemically altering the metamorphosis of the whole organism, but by destroying the little organs such as the nerve cells, which are the origin of the nerves of the chief organs of life. Opium and chloroform act on the myeline, which instead of assuming the granular amorphous form has the appearance of little brilliant bodies.—*Gazette Médicale de Paris*, December 24th, 1864, p. 796.

Spinal Marrow—Nerve Cells—Axis Cylinder.—Two recent articles[1] by Dr. C. Frommann, of Weimar, are here reviewed: "From the fresh spinal marrow of the ox several groups of ganglia of the anterior cornua were removed, pulled to pieces, as fine as could be, in diluted white of egg, and the separate flakes kept as much as possible from the pressure of the covering glass. Thus treated, most of the nerve cells showed a tolerably bright, sometimes almost glassy appearance, others seemed somewhat dimmed. Their surface was very finely granular, and here and there covered with numerous pigment grains. A fibrillary structure in most of the processes was distinctly perceptible. The individual fibrils were laid close to each other, appearing in shorter and longer extent. They had a bright appearance, a faint lustre, and disappeared, sometimes stretched and parallel, and at others in slight wavy lines. Their thickness was variable enough, single ones were 2 to 4 times thicker than other finer fibrils. The substance lying between them was homogeneous, or very finely granular. In individual small processes, which, without division, could be followed further, the fibrils only at some distance from the cell became narrower, so that the process had a streaky appearance, and further on they altogether disappeared. The author saw on the larger processes 10 to 17, on the smaller, 2 to 5 fibrils together. On torn off processes the obliquely separated fibrils appeared as bright, shining, roundish points, of which on the largest processes one could frequently count above twenty. From the stem of the processes the fibrils were generally continued upon their branches of the first order, in which they gradually became indistinct, and then entirely vanished. In the commencing portion of the cell the fibrils subdivide in an arborescent form, but have often a granular appearance; the individual ones in their course do not afterwards distinctly come forward and allow only indistinctly a fibrous structure of the cells to be distinguished. On the other hand, wherever they can be separately followed out, we can, for the most part, see a number of them radiating towards the nucleus; occasionally, however, we see them running from it sideways, or running out further away over it, and sometimes we can distinguish them beyond its opposite pole towards the cell extremity lying opposite. Other fibrils divide themselves along the borders of the cell, and form a fibrous enclosure of it. On the many rayed cells there occurs a crossing of some of the fibrils contained in neighbouring processes partly radiating towards the nucleus, partly towards opposite cell edges. The crossing and plaitings of the latter are especially dense around the nucleus, which they embrace from various sides.

The nucleus is in most distinctly double-contoured, roundish, often irregularly defined, and set with small pointed projections and rounded indentations. Within the nucleus we find embedded in a very finely granular or homogeneous substance a variable number of bright, faintly shining granules, which sometimes are found close together and uniformly distributed, at other times more sparingly and in groups. It could often be shown that single granules were the apparent ends of obliquely rising fibrils, which, running out straight, or slightly curved, could be traced deeply for some distance. By the side of them one sees filaments, isolated, or from two to six together, which pass out together from the edge of the nucleus towards the nucleolus; again other filaments pass over the nucleolus, traversing more or less of the nucleus, and single ones within it describe small arches rising and descending. Individual fibres traverse the nucleus, and pass out again into the cell parenchyma. Then a part of the same radiate towards the cell borders, and soon disappear after leaving the nucleus, or at first rather towards the cell border; but another portion directly pass over into the fibrils of the processes, and thus reprepresent the ends of them entering into the nucleus. In many cells the author was not able, in spite of the closest investigation, to perceive any passage of filaments into the nucleus; on the other hand, he sometimes contrived so that the nucleus, by the preparation, was partly or entirely lifted out of the cell, in which cases he could perceive by the side of the filaments within the nucleus, fibrils, passing singly out of it and projecting isolatedly a short distance, and at the same time the ends of filaments torn off soon after their passing out.

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[1] Virchow's Arch., xxxi.

The roundish, faintly shining nucleolus contains 5 to 10 small, round, brightly shining spots. These are sometimes equally large, at other times there is found along with the smaller and middle sized ones a particularly large spot which amounts to a fourth part of the diameter of the nucleolus. Of the middle sized and large spots it can frequently be shown that they indicate the points of insertion of fine fibrils entering into or passing out of the nucleolus. Individual fibres of the nucleolus were repeatedly traced through the nucleus and the cell as far as the origin of a process. [The reporter has not been able to make out from this, whether the author considers the spots of the nucleoli to be the *real* termination of the fibrils, or if he believes that the fibrils *pass through* the nucleolus, and that these spots are only the optical expression for the part (cross section) of a fibril in focus.] At any rate the nucleolus is a knot point for some of the fibrils, which from the cell processes or other parts of the cells radiate into the nucleus. Whether the other fibrils terminate in the nucleus, or whether their terminations are only apparent, indicating their passing in other directions, in which they again proceed, the author could not decide; the latter, however, is the more probable.

Beside the cells above described there were others, in which closely set and very delicate filaments, in small bundles of about 0·0054 mm. in diameter, entered united into the nucleus. Frequently only the ends of the filaments at their point of insertion into the nucleus were visible as roundish accumulations of fine granules; elsewhere the individual filaments appeared distinctly, and one of them often continued as far as the nucleolus, whilst the others seemed to end in the nucleus. Such bundles were as 1 to 3 in one nucleus; their disappearance in the cell could for the most part be seen only for a short distance, and hence it was not possible to discover whether they passed over into a process. In many cells the threads issuing from the nucleolus were not free in passing between the other fibrils, but enclosed in a tubular continuation from the nucleus. There were then found in the nucleus pale, faintly shining, discoid bodies, of mostly 0·006 mm. diameter, having in their middle a bright more shining granule. The latter could often be traced into a fine shining fibre, which in a very curved bow-shape entered the nucleolus. These tube-shaped processes were found sometimes only singly or a few together in a cell, at other times in larger number; so that, with their ends, they surrounded the nucleolus like a wreath of disks. Most of the filaments issuing from their ends certainly were inserted into the nucleolus, or were directed towards it; single ones, however, passed by it, and entered again in a bow-shape into the depth. Between the nucleus disks, filaments in small number were found, which isolatedly had entered from the cell. The tubular processes, it is true, could frequently be traced into the neighbourhood of a process, but they could not certainly be followed into it; just as little could the author find in the parts torn off from the processes any fibril enclosed in a sheath-like envelope.

In the cells of the spinal ganglia were found relations in part similar to those above described. However, besides this the author observed in these cells processes passing from the nucleus, such as have been already described by Lieberkühn and Wagener. They are tubular prolongations of the nucleus, which extend as far as the cell border, and there come forth. The author saw them but rarely; he computed their diameter at 0·0045 mm. In most of these processes of the nucleus a fine thread could be recognised, which either entered the nucleolus or disappeared in its vicinity.

From the brief communication of the author on the *silver colouring of the axis cylinder* we simply take the fact, that the axis cylinder of portions of marrow, which had assumed a yellow, or, from that, to a brown colour in a silver solution, presented at one time a homogeneous or finely granular aspect, and at another appeared peculiarly cross-streaked, seeming as it were to be set with delicate, somewhat shining cross streaks, lying close together. The mode of the cross streaking is as little constant as the occurrence of the latter generally, and therefore we must ask whether in this case we have not to do with artificial effects.—*Schmidt's Jahrbücher*, vol. cxxv., 1865, page 158.

PART II.—PATHOLOGICAL MICROLOGY.

Alteration of the Muscular Tissue in Infantile Paralysis.—M. Laborde relates a case in which it was only evidenced by paleness and thinning of the muscular fibres, without the fatty degeneration, which M. Duchenne, of Boulogne, affirms to be its characteristic. Five stages of this change are thus described by M. Laborde:

1. One plainly perceives, as it were, traces of the striation of the muscular bundles, but as if spaced out, long intervals, in which it no longer exists, being filled with opaque molecular granulations, of which a great number cover the still striated bundles. These granulations are unaffected by treatment with ether or alcohol; their number is sensibly diminished by a moderate influence of acetic acid. This state, which seems to be one of the first phases of the morbid work, is met with in the muscles least altered in appearance, and which have yet some reddish bundles visible to the naked eye.

2. The striation hardly leaves an appreciable trace, only longitudinal fibres, almost destitute of undulations, appearing in the primitive and secondary bundles; the granular matter always very abundant.

3. The striation altogether gone; the bundles of longitudinal fibres, which alone exist, are rarer; in any case, they are as if smothered in a mass of granulations like those of which we are about to speak. The inter-fascicular spaces are occupied by compressed fibres of cellular tissue and some few nuclei.

4. Only the skeleton, so to speak, of the muscular bundle is seen; at most, it yet contains some appearance of longitudinal fibres; the granular condition is most evident, for the contents of the bundles are made up of the granulations alone. The bundles are also become scarce, the spaces between them are larger than normal, and the cellular tissue fibres there are relatively more abundant in consequence.

5. At last, not only all trace of muscular tissue, properly so called, has disappeared, but the granular matter also hardly any longer exists, as if its part was enacted; only the empty transparent hyaline tubes of the myolemma remain, some few granulations along their walls; these tubes are also far apart, and surrounded by fibres of cellular tissue and fibres, with which are mixed some elastic elements.—*Gazette Médicale de Paris*, Nov. 12th, 1864. pp. 710, 711.

BLOODVESSELS.

The following are recent contributions of Professor Wedl, of Vienna, concerning some of their morbid conditions:

Dislocations of the Small Bloodvessels.—When the coats of the vessel are stretched to more than a certain extent, the particles of which they are composed will not return to their normal relative position, but an enlargement and prolongation of the tube of the vessel is the result. The enlargement will not be uniform because the tissues in the neighbourhood of the vessels offer more or less resistance. The longitudinal extension of the tube of the vessel will commonly result in its taking a winding course. Such dislocations and enlargements of small vessels are well observed in atrophied tooth pulps. The veins, particularly here, often show a three or four times larger section, which they sometimes retain in their whole length. The coats of the vessel assume a more homogeneous appearance by shrinking of their cellular elements. In such vessels we also often find spindle or sac-shaped dilatations, such as are known in the brain-vessels. Dislocations of the vessels in the choroid and retina are well observed in the living eye during the glaucomatous process. Here they are dependent on the excavation of the bulbus by increased intraocular pressure. The author found that in glaucoma there is around the retinal end of the optic nerve an inflammatory infiltration, with formation of heaps of fat granules, and with molecular degeneration, which process, as producing relaxation of the tissue, may certainly (together with the increased intraocular pressure) be of influence in the excavation of the bulbus. Dislocations of small arteries and veins are also observed in the vicinity of many new formations, where we see the same vessel branching out regularly, or wave-like irregularly.

Colloïd Depositions (Corpora amylacea) *in the Coats of the Small Bloodvessels.*—The corpora amylacea upon the coats of the small arteries, veins, and capillaries, are always on their outside. In most cases they project from the surface; sometimes they are surrounded by a capsule, as the author once found in the capillaries of the brain of a rachitic infant. The faintly-shining, gland-like little bodies, in this case were enclosed in a finely granular, sharply defined envelope in immediate connexion with the walls of the capillary vessels. Inasmuch as, in the case in question, the author found these enveloped appendages of the vessels uniformly distributed in the cerebrum, he questions whether they might not be referred to an abnormal brain growth, by which the capillaries were interrupted in their branching, and therefore to be considered as anomalous cell-products. To this he immediately adds, that the cell origin of the corpora amylacea, although for certain cases probable, was, nevertheless, not everywhere proveable. The colloïd masses occur more frequently in small arteries than in small veins. They are not unfrequently found in the bloodvessels of diseased omentum; here, however, in Wedl's experience, they are also found as cadaveric appearances, so that only cases investigated when fresh deserve consideration. The author is inclined to believe that, in individual cases, the colloïd masses were directly separated from the blood, and to be considered as decomposition products of the blood.

Calcifications of small vessels, especially of the capillaries, rarely occur so extensively that whole vascular plexuses appear encrusted with salts of lime. The lime salts are deposited in the capillaries as well as in the coats of small arteries and veins, as small, shining granules, or as glandiform bodies, which project more or less beyond the periphery of the vessel. Numerous degrees of transition are found between the two appearances. The finely granulated form of the chalky deposition we meet with particularly in the small arteries and in the calcified vessels of the brains of drunkards. The deposition does not here take place in the adventitia (as it does frequently in small veins), but in the median coat; in many places larger chalk grains appear to fill up the area of the vessel. After the lime is removed by muriatic acid, nothing more is to be seen of the nuclei of the organic muscle fibres of the vessel. The calcifications of the large arteries always in the first place concern only the newly-formed connective-tissue of the intima.

Connective-tissue Over-growths.—The great share which the cell elements of the coats of the vessels, by their over-growth, take in the establishment of many new formations is sufficiently known. The author, by way of example, mentions a case of diffuse encephaloïd cancer. In the examination of the vessels (which, in the diseased parts, were numerous, had a winding course, and were connected with those of the non-infiltrated parts) it was found that the nuclear over-growths in the t. adventitia of the veins, and the adjoining region of the capillaries, were very marked, whilst the coats of the arteries and the neighbouring capillary regions showed no remarkable nuclear over-growths. The cavity of the tubes of the capillaries appeared to be everywhere wider than of the capillaries of the normal brain tissue. On the outer wall of the veins there were protuberant or knobby excrescences, which were filled with nuclei. They did not appear to be hollow, or to be in connexion with the lumen of the vessels. The fundamental substance in which the nuclei were embedded appeared finely granulated. The original capillary plexus was fast disappearing by wasting; the course of the blood in many places was interrupted in many parts of the new formation. In the apparently healthy tissue around the new formation, numerous nuclear over-growths in the venous vessels were also found, by which is proved the share which the vessels took in the extension and growth of the carcinomatous tumour.

The depositions of connective-tissue upon the t. intima of large arteries are, by the absence of the elastic fibres, essentially distinguished from the connective-tissue overgrowths of the t. adventitia, in which the elastic fibres, with hypertrophic development, exist abundantly. In the depositions of the t. intima, when somewhat considerable, two layers can be distinguished—viz., an inner one, rather hyaline, and a granular layer beneath it. The inner hyaline layer contains some rounded, some lengthened, spindle-shaped connective-tissue cells, which are partly connected by offsets in the way of a network. Frequently mere accumulations of nuclei are to be seen, and they appear grouped in longitudinal series or in clusters. The outer granular and dark layer contains larger globular cells, which are in tolerably close apposition, and are also somewhat connected by offsets. Beside them are found large and small heaps of shrivelled nuclei. In this layer we find numerous inserted nucleoli and balls of elain, lime salts, cholesterine plates, and brownish pigment masses. Here are also formed the plates of the calcifying connective tissue. The connective-tissue overgrowth of the intima, at a later period, after its elastic layer has become indistinct, also invades the media, so that either the layers of the coat of the circular fibres are separated by new-formed connective-tissue, or the inner layers are directly replaced by it. The integrity of the coat of the circular fibres may, however, also be invaded from the t. adventitia if a connective-tissue overgrowth, with new formation of vessels, occurs in the latter. Then the vessels of the t. adventitia also grow profusely into the t. media; and Rokitansky has even followed them into the connective-tissue depositions of the t. intima. In the fundamental substance of the connective-tissue growing between the layers of the t. media we see cells appearing alone or in groups, with roundish or oval nucleus. Besides this, however, the nuclei of the organic muscle cells in the t. media are ordinarily subject to an extensive over-growth. The diminution of the elasticity of the arterial tube depending on the contractibility of the t. media, stands naturally in direct relation to the appearing of the connective-tissue overgrowth in the t. media, and to the thickness of the deposition upon the t. intima.—*Schmidt's Jahrbücher*, vol. cxxiii., 1864, pp. 28–9.

Embolism of the Capillaries of the Lung with Fluid Fat.—Dr. Arnold Uffelmann relates two cases of this kind. The microscopic examination of the lungs presented in both an analogous result; a number of fat drops were to be seen, in which, in the first place, their singular form was observable, some of them were merely extended longways, others branched out tree-like, often forming a perfect network, which was several times seen very distinctly between two of the alveoli. The extension of the fat drops was not uniform, but they generally presented an oval figure, by which they, if numerous, turning their smaller ends to each other, lay behind each other, having a varicose appearance. These ends, however, did not often entirely reach each other, and thus an interval was produced which, in most cases, was distinctly limited—sometimes, however, only on one side—and but rarely was as broad as the fat drops themselves. These figures were particularly found in preparations which had been obtained from the abscesses and from their surrounding parts; also, however, in those which were obtained from still healthy tissue. The appearance did not change by frequently lifting the glass cover and the addition of water. In no preparation was free fat observed. In the region of the changes described, the coating of the alveoli was, however, perfectly normal, their cavities were filled with cells, which had the character of pus cells; in the second case were seen also many pus corpuscles and shrunk epithelial cells, which had lost their polygonal form and had entered into fat metamorphosis; and there were found but few spots in the lungs from which one might not have been able to represent preparations with the figures described which the fat formed.

According to this alone there could hardly be a doubt that the fat drops lay in the vessels, and through them got their singular shape, that the fat had penetrated as far as their finest ramifications, and here formed the network above mentioned; but it was only turned into certainty when the space often observed between two fat drops lying behind each other showed itself as the lumen of the vessel, whilst, after addition of acetic acid the boundaries of the space showed nuclei, which were oval, lengthways, and elsewhere oval across. Most characteristic, however, was the filling up of the smallest arteries in their connexion with the capillaries. As in Wagner's cases, we could also here show the fat in those capillaries, which projected beyond the edge of the alveolus into its cavity, and were uniformly filled with fat; capillary nuclei were also here to be seen after acetic acid was added. In the case described by Zenker, which, although in a genetic point of view is different to ours, yet shows the same result, the presence of fat in the vessels of the lung is not to be doubted, because a large portion of the capillaries was completely filled with blood, so that the fat drops appeared only inserted in the mass of blood. The fat was found in the smallest arteries and in the capillaries, and was easily known by the characteristic qualities which it shows under the microscope.

Although we could only in the lungs show this anomaly, and the changes thereby caused, it is not to be doubted that the abscesses also to be found in other organs may have their origin in fat embolism, especially as Wagner has shown fat in the arteries of the Malpighian bodies of the kidney.

From the size of the fat drops and the narrowness of the capillaries of the lung it is, that only few and small fat drops could reach the veins of the lung, and get thence into the great circulation, that the extension of the vessel obstruction could only be small, and therefore the proof of it must be difficult.

Although it remains undecided how, in many cases of pyæmia, the destruction of the various organs is brought about, inasmuch as we rarely succeed in precisely clearing up the cause, it is satisfactory, nevertheless, at least to know a cause in some cases of this very fatal disease.—*Zeitschrift für rationelle Medicin*, vol. xxiii., 1865, p. 217, &c.

HALF-YEARLY REPORT ON TOXICOLOGY, FORENSIC MEDICINE, AND HYGIENE.

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I. Toxicology.

The past six months have not produced many striking reports of cases of death by poison, and indeed we do not recollect a period when the English, German, French, and American journals have been so happily deficient in the toxicological department. As if to fill up the hiatus, M. Tardieu has written an essay on medico-legal studies in cases of poisoning, in which he has brought to bear the learning of a long experience, infinitely varied in character. We cannot undertake to analyse M. Tardieu's last contribution in full, inasmuch as it occupies seventy pages of closely-argued matter, and is not easily condensed; we shall, therefore, be content to notice two or three of his observations, individually and specially.

Definition of Toxicology.—M. Tardieu holds that Toxicology does not exist as a true science; it is only an artificial assemblage of certain notions on chemistry, natural history, physiology, nosology, pathological anatomy, and therapeutics, having reference to divers substances, so-called poisons. Again, poison itself has neither existence nor individual characteristic. This is shown by the differences of definition of the word poison, the last of which, by Orfila, and the best is—"that the word poison may, and ought to, be given to every substance which, taken internally, or applied to the bodies of man or animals, destroys health or annihilates life by acting in virtue of its nature." Poisons do not constitute an order or a natural group the essence of which may be defined or characterized, while all substances, without exception, which deserve the name, lose or acquire, according to certain external circumstances, their poisonous properties, the medicinal property being always contained in the poison, and the poisonous not being separable from the medicinal property. Toxicology, in its extreme factitious meaning, is forced to set out with the false notion of poison; it studies without method and without processes that are proper to it; and it borrows from physic, chemistry, and botany, the greatest part of the gifts which it appropriates, but which cannot furnish it with the doctrinal principles that are wanting in it. Poisoning, continues the author, in a medico-legal point of view, is one cause of violent death, and ought to be studied as such, in the same way as strangulation, asphyxia, and wounds of all kinds; poison, in fact, is a weapon in the hands of the criminal, and nothing more. It only exists in the condition of having acted; it only reveals and defines itself in its effects—that is to say, in the poisoning; the result is that legal medicine, called in to seek out and determine the cause of every violent death, ought to set out from the fact of the poisoning, and not with the notion of the poison, and should only occupy itself with the poison secondarily, with its state, nature, and physical characteristics; like as in assassination committed by means of a poniard or pistol, the expert examines the murderous weapon, brings it to the wound, and compares it with the injuries that have been inflicted.

Elimination of Poisons.—On the subject of the elimination of poisons from the body, included under the head "Mode of Action of Poisonous Substances," M. Tardieu remarks that the elimination of a poison commences from the first moment of the poisoning, and almost instantly after the absorption; if life should continue, the elimination will terminate at the end of a given time, and it would be very useful to determine this time precisely. The period of elimination is very variable, that is undoubted, and it varies under certain conditions which are not yet sufficiently known. The elimination must, like absorption, vary according to special physiological circumstances in the animal species, and according to individual organic conditions, the influence of which it will always be difficult to appreciate with exactitude. M. Chatin has, however, conceived that a law of elimination could be established, and has advanced the statement that the rapidity of elimination in various animals is in an inverse ratio to the faculty of their resistance to the poison—that is to say, a poison will remain so much the longer in organs the economy of which is least affected by it. There is variation also in respect of the duration in each kind of poison, and science is indebted to M. L. Orfila for setting the initiative of very useful, but unfortunately as yet unfinished researches. From these experiments, —which are, perhaps, wanting in multiplicity—it results that the elimination of arsenic and corrosive sublimate is complete in thirty days; of tartar emetic, tartrate of antimony, in four months; of nitrate of silver in five months; and of acetate of lead and sulphate of copper after more than eight months.

Can Poisoning occur and the Poison disappear?—On this point Tardieu is of opinion that a poison, almost in its totality, may be vomited and expelled the organism; but it is very rare, and nearly impossible, if the patient live, for a certain portion of the poison not to be absorbed and excreted so as to be detected by analysis in the excretions; it is also rare, if the patient die, for no portion of the poison to be detectable in the various organs into which it would be carried by the circulation. The true question consists in asking—Do traces of poison remain in the living body for a determinate period, or does the poison remain indefinitely, in the dead body? On this last point the author states that mineral substances resist indefinitely, but they do not escape transformation; some are fixed in such stable combination that chemistry will always detect their presence. Others, on the contrary, by being rendered soluble, are exposed to the possibility of being carried away from the debris of the body in the process of decomposition. Ammonia, which is produced in putrefaction, is the basis of these combinations; but the slowness with which the combinations form, and the still longer time they require for their complete dissolution, under the ordinary conditions of burial, leaves room to say that even after several years, and so long as any part of the body remains, chemistry can find the traces of mineral poisons in exhumed remains. Organic substances, or at least the greater part of those used as poisonous agents, notably the vegetable alkaloïds, resist with remarkable fixity and for a very long period. At the same time science cannot say that the organic series are as fixed as the inorganic.—*Annales d'Hygiene Publique*, October, 1864; January, 1865.

[The observations of M. L. Orfila in respect to the elimination of tartarized antimony accord with our own. We have detected tartarized antimony in the bodies of animals four months after the last dose of the poison had been taken, the liver being the organ in which the poison was stored. The observation of M. Tardieu on the resistance to decomposition of organic poisons laid up in decomposing organic remains, are worthy of note. We remember seeing Messrs. Rogers and Girdwood demonstrate the presence of strychnia in the rotten tissues of an animal that had been dead two years as perfectly as in a solution of the poison recently made.]

Poisoning by Cyanide of Mercury.—A medical student, nineteen years old, took two grains of cyanide of mercury on the 3rd of December, 1863. He dissolved the salt in beer. He immediately became ill, and was soon seized with vomiting, which was continuous. Diarrhœa followed in ten minutes, and both symptoms alternated until ten o'clock on the following morning. There was a little taste in the mouth, great pain in the bowels at every action, giddiness, pain in the head, thirst, and sensation of cold. The face was cyanotic, the pupils widely dilated, the extremities very cold, the pulse weak and 130 per minute; the sounds of the heart were feeble; the abdomen was distended and painful to the touch. After the administration of milk, an emulsion, and after the application of cold bandages to the head, the sickness subsided, and on the evening of the 4th had ceased altogether. Afterwards, two sanguineous evacuations were passed, and the pulse became very feeble. On the 5th there was difficulty of swallowing, with redness of the mucous membrane of the throat. On the 6th the tongue was much loaded, and vomiting recurred twenty or thirty times in the night. This was twice repeated on the following night, and it returned daily until the 21st of December. In the course of the case, dating, in fact, from the 8th, small pustules formed on the left side of the tongue and on the soft palate; the pustules after a time burst and gave place to irregular ulcers; ulcers also formed on the right side of the tongue. The evacuations from the bowels continued to contain blood, at times, until the 8th, then they were soft or dark and feculent, and at last natural. The bladder was empty from the 4th to the 10th, and the urine at first passed was highly albuminous, but this symptom gradually subsided, and on the 18th of December it was perfectly normal. On the 7th of December there was profuse bleeding from the nose, which recurred often, many times in the day, until the 19th, with the exception of the 18th. Headache and giddiness lasted many days unchanged. After the 20th there was obstinate constipation, which was relieved by enemata. The pulse sank until the 15th, when it had fallen to fifty beats in the minute. It now rose again, and continued rising gradually to the 21st, when it made 104 beats per minute. On the evening of that day it sank to 88 beats, and on the 22nd to 76. Throughout it was also irregular, but on the 22nd it became regular in its stroke. The patient gradually improved, but, owing mainly to the loss of blood from the nose, there was great exhaustion. At the end of December recovery was complete.

Dr. Moos, the narrator of this case, says he has been able only to find the histories of two other similar cases of poisoning. The effect of the poison he considers to be fourfold: 1. On the mucous membrane of the digestive tube and the salivary glands. 2. On the nervous system and brain, as shown by the effect on the pupils, which were dilated. 3. On the kidneys, as shown by the circumstance of suppression of urine until almost the sixth day, and the presence of albumen in the secretion when it again appeared. 4. On the blood, as indicated by the recurrent hæmorrhage from the nose, to which the patient had never before shown disposition except during typhus fever, which he had suffered from five months previously.

Dr. Moos further points out the similarity of several symptoms with those of poisoning by corrosive sublimate, especially in reference to the stomatitis salivation and suppression of urine.—*Virchow's Archiv*, xxxi. p. 117, 1864; and *Schmidt's Jahrbücher*, Band cxxx. No. II., 1865.

Poisoning by Digitalis.—Three gentlemen in Quebec called at the drug store of Messrs. Sturton and Co. of that city, and ordered a stimulating drink. The dispenser, by mistake, gave them each a draught containing tincture of digitalis instead of tincture of gentian. The effects of the poison began to be manifested almost immediately after the gentlemen had left the store. Each of them complained that their fingers and the extremities of their toes were affected alike, and that a burning sensation, as if pierced by needles, was troubling them; but they did not for a moment suspect they were poisoned. Before they had proceeded one hundred yards the poison had taken such effect that Mr. Murney, one of the sufferers, had fallen twice from exhaustion, and on entering the Russell Hotel, where they were staying, Mr. Rankin, another of them, fell senseless on the table of the reading-room. Dr. Marsden and one or two other physicians were now called in, and the stomach-pump and antidotes were employed. Mr. Murney lingered on for an hour and a half and then expired. His two companions lay in a low condition for some time, but ultimately were pronounced out of danger.—*Quebec Daily News and Pharmaceutical Journal*, Feb. 1, 1865.

[We regret that further particulars have not been given of this serious and deplorable accident. The dose of the tincture of digitalis is not supplied, and the details of the post-mortem examination in the case of Mr. Murney are wanting. It is nevertheless of importance to note that the symptoms produced by the poison in three different persons were uniform as to time, that the poison seems to have been absorbed with great rapidity, and that the first symptoms experienced were peripheral and analogous to those which mark the onset of sudden paralysis.]

Tests for the Calabar Bean.—Dr. Edwards, of Liverpool, has investigated the subject of testing for the detection of Calabar bean, a substance by which, it will be remembered, several persons were poisoned last year in Liverpool. Dr. Edwards shows that when the Calabar bean is decorticated it yields 30 per cent. of spermodium, and 70 per cent. of white kernel. Exhausted by about three times its weight of hot rectified spirit, it yields 5 to 6 per cent. of alcholic extract, which, upon evaporation, separates into two liquids, miscible with chloroform, but soluble only with ether.

The alcoholic dry extract yields, with water, an emulsion of a white character, which becomes pink by exposure to air and light. In the proportion of five grains of extract to one fluid drachm of water, equal to one hundred and twenty grains of kernel, one minim represents two grains of kernel. This quantity, applied to the pupil, produces a contraction which is maintained for five days.

The tincture is prepared by percolation; thus—

Kernel, in powder . . . . ℥j.
Spirit of wine . . . . ℥j.

Macerate forty-eight hours, then percolate with one ounce of spirit, or sufficient to produce two ounces of tincture. The dose is from five to fifteen minims, five minims being equal in activity to three grains of the kernel.

Both acids and alkalies develope peculiar colouring principles. One appears to be a red colouring matter, developed by caustic potash; in an aqueous solution it may be removed by chloroform, and collected therein as a brilliant scarlet opaque solution. A pink colour is also developed by sulphuric, nitric, and hydrochloric acids, with, however, a coagulation of some albuminous principle. Caustic soda simply bleaches the extract, whilst caustic ammonia developes a yellow colouring matter which, upon exposure to air, gradually changes from yellow to a grass green, and finally a stable indigo-blue colour. It is not improbable that the latter reaction may be an important fact in the commercial history of the bean. The physiological properties of the bean being perfectly antagonistic to those of strychnia, it is somewhat remarkable that the chemical reactions of the extract bear a remarkable resemblance to strychnia with the "colour tests." The chief distinction lies in the crystalline character of strychnia, and the fact that it is not changed in colour by sulphuric acid. When chemicals yielding nascent oxygen, or ozonised salts are added to the acid mixture, the reactions consist of a play of blue, purple, and red colours, which might be mistaken, when observed in minute quantities, for those of strychnia.—*Pharmaceutical Journal*, November, 1864.

Lead Poisoning through Snuff.—Professor Hugo Zeimssen records a very instructive case of insidious lead-poisoning by means of snuff. A tailor, thirty-three years old, strong and previously healthy, remarked from April, 1859, slight pains in the abdomen, and general relaxation, which was increased with every corporeal exertion, until great weakness was manifested, accompanied with profuse perspirations. The patient lost flesh; his movements were uncertain, his gait tottering; his appetite failed, and he had a special disinclination to warm foods. During the succeeding month, more especially after every meal, he had a sensation of oppression in the epigastrium, which soon passed into a gnawing pain, with pain in the umbilical region at a little later date. The pain usually lasted one or two hours each day, and had no reference to meal times. In July, these pains had increased, and were often accompanied with vomiting. The appetite was now entirely lost, and the breath from the mouth gave out a disagreeable sweet smell. Under the action of aperient medicines the bowels were relieved, but with colic. The man continued getting further prostrated; and in September, owing to the more rapidly increasing weakness, he was obliged to keep to his bed. In October, the pituitary membrane and conjunctiva assumed a yellow grey colour; the gums on both sides along their edges showed a violet line, and at the same time there was experienced a dragging pain in the shoulders and arms. Three weeks later there was palsy of the upper extremities, which was specially marked in the shoulders, fore-arms, and hands; these parts also fell away: Dr. Zeimssen saw this patient first in November, 1859, at which time palsy of the deltoïds, and of the extensor muscles of the hands and fingers was present, but was most marked on the right side. All movements that could be made by the patient were attended with great tremor of the extremities. Physical examination of the thoracic and abdominal viscera showed nothing abnormal in the lungs, heart, liver, or spleen, but the epigastrium on the left side was peculiarly sensitive to touch, and the stomach was much distended. The yellow colouring of the conjunctiva continued, and the mucous membrane of the palate and of the nose was of a bluish grey. The urine was extremely rich in urates.

Dr. Zeimssen at once diagnosed lead-poisoning, and on searching for the cause of the disorder, found that the patient had for eight years used continuously a snuff which was found, on analysis, to contain 4·747 per cent. of lead. His snuff had been packed in lead in former years, but of late years in tinfoil; the tobacco was only separated from the tinfoil by a very thin layer of blotting-paper, in which were numerous small holes. Experiments were made with the saliva of the patient, but lead could not be detected in it.

The patient was at once ordered to suspend the use of snuff, and under the administration of morphia and croton oil, with emollient applications over the stomach, and the employment of aperient enemas, his general condition so far mended that in about twelve days the loss of appetite, which had lasted for nearly five months, gave place to decided hunger. The colic had almost entirely disappeared, and the bodily powers were so far restored that the patient was able to go out. In the middle of December, the man entered hospital, and was treated medicinally with bicarbonate of potassa and sulphate of potassa in water (made into a kind of mineral water) every morning, while in the course of the day he had a warm bath, followed by an hour's sweating, during which the negative pole of the induction current was applied to every paralyzed muscle. These measures exerted the best influence not only on the general health, but also on the movement of the affected muscles, so that the patient was enabled to be discharged in February, 1860, very much improved. In brief, in spite of a long and constant Faradization of the muscles, when the author examined the patient for the last time, in the latter part of the summer of 1860, he found there was still palsy; and although this was diminished on the right side, the man was obliged to give up his trade.—*Greifsw. Med. Beitr. II.* p. 234. 1864.

Death from Chloroform.—Mr. Gaine, of Bath, has favoured us with a report of a death from the inhalation of chloroform which occurred in the Bath United Hospital in the latter part of last year, 1864. "John D., aged fifteen (a twin), had chloroform administered for a surgical operation. There was nothing in the external appearance of the patient to contra-indicate its use, with the exception of some slight malformation of the sterno-costal cartilage of one side of chest. On auscultation and percussion, healthy sounds were elicited. The chloroform was administered on a small napkin folded into a hollow cone. There was little excitement apparent, though the heart's action for the first minute or so after commencing the inhalation was slightly increased; but the tone and character of the impulse were normal. The respiration was natural, the eye steady, and the pupils of ordinary size. The time occupied, from beginning the inhalation to the commencement of the operation, was from ten to twelve minutes, and the quantity of chloroform used about three drachms by measure. The boy was quite composed nearly the whole time, and inhaled the chloroform without its producing any of the phenomena, presented in most cases, indicative of transition from stage to stage towards anæsthesia. The eye remained sensible to touch, and the pupils unchanged, until within ten or fifteen seconds prior to the commencement of the operation, and the pupils then contracted slightly; the muscles were relaxed; the pulse and respiration remained unchanged. The operation was now commenced, and simultaneously with the entrance of the knife the boy made two strong convulsive starts and screamed out, and almost synchronously with the second spasm the heart's action suddenly failed. Restorative means were at once employed to endeavour to resuscitate him, and were persevered with for some time, and though there were two or three convulsive respiratory efforts, these were but illusory, and life may be said to have ceased when the heart failed."

[The cause of the death in this case is not very clearly explained by the post-mortem appearances. In fact, there was no morbid condition, except the fluid condition of the blood. The question arises whether such fluidity was sufficient to account for the fatal syncope. There can be no doubt the presence in the body of a blood so preternaturally fluid is incompatible with the idea of a healthy organism, and that it indicates a condition of muscular force low in the scale of power; a heart fed by such blood would consequently sink more quickly under the influence of a depressing agent than would a heart supplied with richly fibrinized and thoroughly oxygenated blood. Again, it is possible that a blood so thin would absorb chloroform with greater rapidity than a normal blood, and that, although no more of the vapour of chloroform was presented to the patient under its influence than is common, more of the vapour might have been taken into the system. One other observation is worthy of comment; the symptoms of sinking commenced with the first infliction of the operation. The patient, though insensible, felt the shock, and the pulse at once registered the fact by a sudden failure of its power; there was, in plain words, shock under chloroform. We have ourselves noticed this same event more than once, and would call attention to it earnestly. In a patient to whom we administered chloroform four times, while Mr. William Adams endeavoured to set free by forcible motion an anchylosed knee-joint, the pulse every time came suddenly still immediately on the application of the force. We saw also the same phenomenon occur in a patient who was having a molar tooth extracted. The patient in this case was profoundly narcotized, and the extraction of the tooth elicited no external sign of pain; but the pulse fell so that for some seconds it could not be felt, and in the narcotized state the sufferer passed through all the phases of a fit of syncope, and was three hours in the process of recovery. On recovery she remembered nothing of what had occurred, and persisted in it that she was unconscious of any pain.]

Apparent Death from Chloroform. Recovery.—Dr. John H. Packard relates a case which occurred in the Episcopal Hospital of Philadelphia on Oct. 27th, 1864. The patient, an Englishman, aged forty-nine years, was about to have a cystic tumour removed from his back. He was placed under chloroform by Dr. Cheston, the narcotic being administered by being poured on a sponge, with a towel folded on a sponge and placed over it. Anæsthesia was produced without any unusual sign, and the operation had just commenced when the pulse began to flag. The pulse sank and ceased. The respiration continued a little longer and then ceased also. The surface became pale and livid; his eyes were glazed and turned upward; and the whole aspect was that of a man just dead. The operation was stopped, brandy and ammonia were poured down the throat, and the tongue was pulled forward. These measures seemed to take no effect. An electro-magnetic battery was next brought into use, and a current was passed through the chest, one pole being placed over the upper dorsal spinous process, and the other over the apex of the heart. In a short time there was return of the pulse at the wrist, and as the pulse grew stronger there followed a long, deep sigh, and respiration was re-established. The lividity of the countenance passed away, and recovery took place. Dr. Packard is of opinion that for at least eight or ten minutes the patient was without pulse or breathing, and exhibited all the phenomena of recent death.—*American Journal of the Medical Sciences*, January, 1865.

Death by Chloroform.—Dr. Packard relates another case communicated to him by Dr. Clinton Wagner, in which death actually occurred. The patient, a soldier, had a leg amputated for a gunshot-wound on September 28th, 1864. He was placed under chloroform on this occasion, the operation was performed, and he recovered from the anæsthesia without any bad effect. On the 15th of November, the flaps of the wound having sloughed, he was placed again under chloroform for secondary amputation. The chloroform was administered from a sponge, about a drachm and a half being used at a time, and in all an ounce was employed. The room was well ventilated. The patient had been under the influence of chloroform for fifteen minutes, when he began to sink, and in five minutes he was dead. Various attempts at resuscitation were employed; cold water was dashed in the face, ammonia was given by inhalation, and the "ready method" of Marshall Hall was brought into operation, but no favourable result was obtained. A post-mortem examination was made, but no reason for the fatal event was discovered. The heart and lungs were perfectly healthy. The patient took more chloroform on the previous occasion, and the only symptom that contra-indicated the inhalation was nervous agitation from dread of the operation.—*Ibid.*

Poisoning by Drinking Chloroform.—A soldier, aged twenty-seven years, drank off in mistake for alcohol one fluid ounce and a half of chloroform. He soon commenced to vomit, and became insensible. The pupils were widely dilated, and the face assumed a death-like appearance; the breathing was stertorous, and the heart's action tumultuous; the pulse beat one hundred per minute, there was complete relaxation of the limbs, and the most perfect general anæsthesia. After a time the pulse became imperceptible, and the respiration was at intervals arrested. This state continued for three hours; an hour later, the pulse rallied, the skin became warmer, but the anæsthesia continued. At the end of six hours he was much better, and from this period continued to recover. Next day he was comparatively well, but had no recollection whatever of what had occurred. He was treated by the application of external stimulants, artificial respiration, and enemata of strong infusion of coffee.—*L'Union Médicale*, Octobre, 1864.

On the Quantitative Determination of Antimony by Marsh's Process.—M. Blondlot has been conducting researches on the loss of antimony, which occurs by its deposit on the zinc, in estimating quantity by Marsh's process. After acidulating distilled water with hydrochloric, sulphuric, and tartaric acids, he placed in the solution a measured quantity of the tetra solution of antimony, and then pure zinc. When all the zinc had disappeared, he carefully collected all the antimony precipitated on a filter, washed it, and having well dried it weighed it, and compared it with the original amount contained in his antimonial solution. By a further process he collected the antimony that had been dissolved and that which escaped in the form of antimonuretted hydrogen. After some experiments conducted in this way, Blondlot found that no correct relationship existed between the amount of antimony deposited and the amount carried over in the gaseous state. Various circumstances modify these relationships: when hydrochloric acid is used as the acidifer, the quantity of antimony deposited is smaller in proportion as the acidification is stronger, so that when the acid is used concentrated there is scarcely any metallic deposit until the acid is weakened. While the experiments thus performed do not indicate precise results, they show in their *ensemble* that an average of about one-third of antimony takes the gaseous form, as compared with that which is deposited. Blondlot calls particular attention to the errors of toxicologists who consider Marsh's process most delicate for the determination of antimony, but omit in their calculation the large quantity of the metal that is deposited. All error of this kind, in which no difference in the process is made between the detection of arsenic and of antimony, is an inadvertence that ought at once to be corrected; the error explains the reason why skilful toxicologists have found Marsh's process unfaithful as a quantitative test for antimony, which process they have thrown aside without explaining the way in which its defects were produced.—*Revue des Sociétés Savantes*, April, 1864.

[The loss of antimony by deposit in Marsh's process has not so entirely escaped the attention of practical toxicologists as M. Blondlot supposes; but it is obvious that his methodical and shrewd researches are of vast importance. It remains for him to point out the precise conditions under which the deposit takes place, and to find a standard method by which the deposit may be collected and its quantity determined.]

II. INSANITY.

War and Insanity.—Dr. Nichols, the superintendent of the Government Hospital for the Insane in the United States, reports, in forcible and clear terms, on the relation of the present civil war to the progress of insanity. He says, "The department of the interior will learn with interest, we doubt not, that the number of the insane received into this hospital during the year under review was greater than the greatest number ever received in the course of any one year by any other one institution on this continent; also, that owing to the immense armies and very large naval forces with which the war has been, and still is, prosecuted, and the specific sources from which our patients are mainly derived, a larger proportion of the cases received were affected with acute forms both of mental derangement and of idiopathic bodily disease than were ever before, in the course of one year, admitted into any one establishment on the globe.

"It should not be inferred that the war has been a prolific *moral* cause of insanity either among the men of the land and naval forces, waging hostilities against the common enemy, or among civilians of either sex or of any class. In not more than two per cent. of the four hundred and ninety-three cases received from the army since the war began has even the exciting cause of mental disorder appeared to have been either the profound excitements attending a personal participation in active military hostilities prosecuted on the largest scale, a sense of great personal danger in battle, or anxiety and misgivings respecting the result of a great contest, in which every man of much moral susceptibility feels the deepest personal stake.

"The existence of more or less home-sickness among the national troops—perhaps the most pardonable weakness which a citizen soldier in the field can display—has been rendered evident by the character of the morbid manifestations exhibited by several of our army patients.

"Excepting a small proportion of cases caused by intemperance, cranial injuries, tumours, and other organic cerebral affections, necessarily sooner or later disturbing the mental manifestations, the insanity which occurs among the volunteer and other soldiers drawn from high temperate latitudes, campaigning in the lower latitudes of the same zone, appears to us to be, in most instances, one of the extreme consequences of a depression of the vital forces. The best constitutions are subject to such *sthenic* diseases as pneumonia and acute rheumatism, but with the exercise of a fair amount of prudence, they are often invigorated from the first by active service in the field. The weaker of the men, uninured to a soldier's life, are overmatched by the privations, exposures, and fatigues of active service; especially when serving in a malarial region, they first become thin and enfeebled, and then, upon some extraordinary exposure or fatigue in such a state of debility, there supervenes either an intestinal flux or a low form of fever, sometimes both, as distinct diseases. It is in the course or at *the close* of this series of agencies, which impair the strength and tone of the nervous system, that unsound mental manifestations begin to exhibit themselves.

"Most of the great political and social convulsions that have occurred in the course of the modern history of enlightened nations, have been attended with a manifest increase of insanity among the peoples most affected by such upheavings of society: but contrary to the anticipations which history authorized us to entertain at the outset of the struggle, the admission of civil cases into this hospital, situated in the very midst of the perturbations of the war, has been fewer during the last two years than before. We find that this exceptional feature in the domestic strife of arms in which we are engaged is noticed by the medical directors of the two largest institutions in the loyal States.

"This important exception to the teachings of previous history cannot be accidental. It has been too uniform and too long continued for that to have been the case. It must be due to some peculiarities either in the character of our people, or in that of the war itself."

III. FORENSIC MEDICINE.

On the Medico-legal Examination of Spots of Blood.—M. Roussin has published an elaborate essay on the determination of spots of blood. He considers that the examination for albumen and for fibrin is not reliable; and as regards the detection of blood-crystals, he thinks they, as tests, are wanting in the two scientific essentials—rigour and constancy. He next dwells on the microscopic tests; and, having explained the manner in which the blood-corpuscles may be correctly defined and measured, he proceeds to point out the distinctive microscopical characters of human blood-corpuscles. If the blood is fresh the measurement is easy; but when the blood is dried, as on a cloth or other tissue, the difficulty becomes very great. The best plan is to take up the globules in a solution, which preserves them and brings them back to their normal condition as near as is possible. The solution which answers the purpose most readily, according to the author, is made by mixing three parts, by weight, of ordinary glycerine with one part of concentrated and pure sulphuric acid, and a sufficient quantity of distilled water to bring the whole, at a temperature of 15° Centigrade, to a density of 1028. Care must be taken not to apply this liquid with a metallic substance, but to take it up with a tube of glass.

Numerous details are rendered showing the manner in which the blood is to be examined in solution, and then we are brought to the question of the measurement of human blood-corpuscles as compared with the measurement of those derived from inferior animals. Roussin gives the following table of these measurements:

Blood-corpuscle of	man	Diameter	1·126	millimetre.
„	dog	„	1·139	„
„	hare	„	1·142	„
„	pig	„	1·166	„
„	ox	„	1·168	„
„	horse	„	1·181	„
„	sheep	„	1·209	„

If the red globules of various animals are thus compared, it seems easy, at first sight, to make a clear diagnosis. But M. Roussin very properly points out that the difference produced by the osmosis is such that even in the most marked case where the evidence seems to be conclusive, the expert ought still to be cautious in affirming that the blood actually is human. The author recites a case in which a man had been assassinated. Two days after a person was arrested on suspicion as the murderer. In the possession of the supposed criminal was a blue blouse and a pocket-handkerchief with red spots upon them. The man denied the charge, but could not account for the appearance of the spots. A commission was instituted to examine the spots. The microscopical examination showed that the spots were blood, but that the corpuscles were elliptical. There were also imbedded in one of the blood-spots three glittering scales, the form and colour of which showed them to be the scales of a fish. Hence the commissioners reported that the stains were from blood;

that the blood, from the appearance of its corpuscles, must belong to the blood of fish, bird, or reptile, and from the presence of the scales they inferred that the blood was that of a fish. The man was acquitted, and forty days afterwards the true assassin was found, and convicted on his own confession. Another case is recited in which it was impossible to affirm that the blood was human, but in which it was quite possible to say that the blood was not that of a goose or other bird. The author states incidentally that the dried blood of a goose, on being taken up by the preserving liquid named above, showed elliptical red corpuscles.—*Annales d'Hygiène Publique*, Janvier, 1865.

IV.—HYGIENE.

Sang de Rate: Splenic Apoplexy.—M. Isidore Pierre communicates an interesting paper on the splenic apoplexy of the bovine and ovine species of animals. He states that animals attacked with the disorder present blood abnormally rich in albumen, fibrin, and globules, and poorer in the aqueous elements; such animals are also too full of blood in their circulation. The disease is generally unknown in new countries, and this whether the vegetation be thin and poor, or vigorous. It is also everywhere less common in wet seasons and years. The disorder is most common in dry weather, then it attacks with the greatest severity. Badly-fed animals are least susceptible; and in the same country, and in the same flock, the animals in the best condition are generally those that first suffer. The blood in animals that have succumbed is shown to contain animalcules, called Bacteria. The richness of the blood in plastic constituents, and the presence of Bacteria are, says M. Pierre, interesting facts as the immediate causes of death; but the grand questions are, why does this great plasticity of blood manifest itself more in certain countries than in others? Why is the development of Bacteria not observed generally? On these important points he gives the following *résumé:*

"1. In countries where the animals are subject to 'sang de rate,' the vegetable world on which they feed, when it has arrived at a complete state of development, is less aqueous than elsewhere. It is, moreover, richer at an equal weight, and at the same degree of dryness, in nitrogenous principles.

"2. The flora of the plateau of 'la Beauce' (where the author's observations have been made) is very rich in leguminous vegetables, which, as plants, are peculiarly nitrogenous.

"3. The plants are little developed in height, and in them the weight of the foliage is notably greater in proportion to the other parts than in plants of the same species which have reached a greater height.

"4. Animals which feed on the smaller plants consume a larger portion of foliaceous matter,—i.e., of parts richer in mineral substances, oxide of iron, and nitrogenous principles."

As a remedy for the disease, M. Pierre suggests the institution of an entire change in the feeding of the animals, by reducing the nitrogenous elements of food and supplying more water.—*Revue des Sociétés Savantes*, Octobre 28, 1864.

On the Influence of Military Life on Men of different Ages.—The Statistical Bureau of the Sanitary Commission of the United States has investigated the records of about nine hundred organizations or bodies of troops, involving the examination of 10,000 muster-rolls, and representing an aggregate force of nearly 800,000 men.

"In regard to the question of the relative efficiency of men in active service at different ages, the difficulty of obtaining data for its discussion makes it not an easy matter to conclusively determine. The only available information, likely to throw light on this subject, was derived from records of deaths and burials, now being collected and recorded, under the official management of Brigadier-General Rucker. As these records were received, entries were made on a large register of the name of the deceased soldier, his age, regiment, and cause of death; together with such other information as would render it not only a means of future identification, but also a document of considerable historic value.

"Having obtained permission to make such use of the facts contained therein as they saw fit, the Commissioners exhausted all the information relating to the age of the soldier, and the cause of death. Somewhat over 2000 deaths were recorded.

"The results seemed to indicate that the mortality was *less* between the ages of eighteen and twenty than between twenty and twenty-five, but *greater* than among those of twenty-five and thirty-five."—*The Sanitary Commission Bulletin*, May 1st, 1864.

V. SUMMARY.

On the Influence of Race on the Development of Diseases and the Duration of Life.—The writer states that Jews are more advantageously placed in respect to the duration of life than Christians. One reason for this is that the Jews, compared with Christians, possess a larger population of persons belonging to the middle ages of life; hence the number of their widows and orphans is comparatively small.—*Annales d'Hygiène Publique*, Janvier, 1865.

On the Kola Nut of Tropical West Africa. (*The Guru Nut of Soudan.*) By W. F. Daniell, M.D., F.L.S.—Dr. Daniell shows, for the first time, that the Kola nut contains the vegetable alkaloïd theine, and that its properties, which much resemble those of tea, depend on the same principle. The quantity of theine in the dried nut is proportionately smaller than in tea.—*Pharmaceutical Journal*, March 1st, 1865.

On Climacteric Insanity. By Francis Skae, M.D.—Dr. Skae shows that climacteric insanity is a disease easily recognisable; that it is one of the most curable forms of insanity accompanied by melancholia; that the duration of the insanity in curable cases rarely exceeds from three to six months; that this form of insanity, apart from suicide and organic disease, rarely tends to a fatal termination; that the best treatment consists in removal from associations, watching, and judicious use of narcotics, and that a climacteric condition period occurs in the male between the ages of fifty and sixty.—*Edinburgh Medical Journal*, February, 1865.

On the Several Means of Providing for the Yearly Increase of Pauper Lunatics. By C. L. Robertson, M.D. Cantab.—Dr. Robertson pleads for a fair extension and adjustment of the existing system. He opposes the formation of lunatic wards in workhouses, proposes an extension of county asylums, so as to ensure a gain of twenty thousand beds, and recommends that the jurisdiction of the visiting justices should extend over all the insane poor of each county.—*Journal of Mental Science*, January, 1865.

Climate and Diseases of Oregon. By R. Gilsan, M.D.—With the exception of a few prairies, the whole country of Oregon is an immense forest of fir and cedar, mainly the former. It is the natural home of the Indian. Gold has been found on the sea beach along the entire coast, and also in various places back in the mountains. The whole of Dr. Gilsan's paper is full of interesting and instructive details.—*American Journal of the Medical Sciences*, January, 1865.

On the Neglect of Sanitary Arrangements in the Homes of the Rich and Poor in Town and Country. By Evory Kennedy, M.D.—A paper read at the Royal Dublin Society. Treats on the ventilation of churches and public buildings, on heat, on clothes, and on the results of attention to sanitary arrangements. A clear and able paper, written without undue enthusiasm, and recording without prejudice the good that can actually be effected by sanitary measures.—*Dublin Medical Press*, March 15th, 1865.

On the Influence of Professional and Social Positions on the Duration of Life. By Dr. Majer.—The author of this inquiry undertakes to prove that members of the theological class attain a greater longevity than do the other professions and most other callings, while medical men stand higher in the scale of mortality than the other classes of the community. Three-fourths of medical men die before they are fifty, and ten-elevenths before they are sixty.—*Canstatt's Jahresbericht*, 1864, Band vii.

QUARTERLY REPORT ON SURGERY.

By John Chatto, Esq., M.R.C.S.E.

I. *On a Rare Variety of Inguinal Hernia.* (Cooper's Encysted Hernia of the Tunica Vaginalis.) By M. Bourguet. (Gazette Hebdomadaire, 1864. Nos. 44–50.)

As the result of an elaborate investigation into the nature of this form of hernia, M. Bourguet arrives at the following conclusions: 1. There is a variety of hernia characterized by the presence, within the tunica vaginalis of the testis, of an isolated and independent hernial sac. 2. This sac, entirely distinct from the tunica vaginalis, is formed by a diverticulum of the peritoneum, which becoming engaged within the superior orifice of the inguinal canal, afterwards projects within the cavity of the serous membrane of the testis. 3. The tunica vaginalis then presents a more or less considerable enlargement, and may become the seat of an accumulation of liquid, which co-exists with the hernia. 4. The designation, "hernia with a double sac," or "hernia with intra-vaginal sac," would seem to be more appropriate, as giving a more exact idea of the nature of the affection than that of "encysted hernia of the tunica vaginalis," bestowed upon it by Sir Astley Cooper. 5. The nature of this hernia is accidental, not congenital, and its mode of production, its symptomatology, its progress, and its anatomical characters, place it in the same category with ordinary inguinal hernia. 6. Strangulation may not only take place at the neck of the sac and the aponeurotic rings, but also much lower down, within the interior of the tunica vaginalis itself, through a laceration of that membrane. 7. The increased extent of the tunica vaginalis, and the presence of liquid in its interior, may lead the surgeon into error at the time of the operation for the strangulated hernia, causing the sac to be mistaken for the intestine, and leading to the belief that the sac has been opened, when the tunica vaginalis only has been entered. 8. In order to avoid this error, of which examples are recorded in the annals of surgery, the sac should be drawn out and cautiously opened either with the nails or by the bistoury.

II. *On the Tracheo-perforator.* By Dr. Rohlfs. (Deutsche Klinik, 1864. No. 34.)

Dr. Rohlfs having experienced great difficulty in introducing the canula during tracheotomy, devised a trocar, which he terms a tracheo-perforator, and which is exactly adapted to Trousseau's double canula. After laying bare the trachea, and fixing it, and causing it to project somewhat by means of a hook, the perforator is passed in with a gentle rotatory motion; and immediately after an entrance has been effected the trocar is withdrawn, leaving the canula. The tracheo-perforator is about five inches long, having a handle sufficiently large to admit of its being easily grasped. In this handle is set a trocar, two inches in length, having a curve of a quarter of a circle, and exactly adapted to the outer canula, which covers it to within four lines of its point; this point is of a rhomboid form, having four sharp edges, the upper surface corresponding to the convexity of the curvature, being somewhat larger than the others. By the aid of this instrument the operation becomes much simplified, two stages, in fact, being reduced to one. The difficulties which exist in determining the exact size of the incision into the trachea, and in the introduction of the canula, are obviated, while the entrance of blood, or discharges into the air-passages, is obviated. As yet, Dr. Rohlfs has only employed it in one case, a very unfavourable one, in which it acted very satisfactorily. Unfortunately, the patient died on the fifteenth day, and two days after the canula had been removed, from arterial hæmorrhage, produced apparently by the edge of the canula having been made too sharp, a defect which has subsequently been remedied.

III. *On Cataract in Children.* By M. Guersant. (Bulletin de Thérapeutique, Feb. 15th, 1865.)

Congenital cataract is sometimes hereditary, but generally occurs without any known cause. Sometimes it is quite completely formed at birth, but usually it is only commencing at the early period of life, and does not become very appreciable for some months, or even years. In subjects born with incomplete congenital cataract and who reach the age of reason, we find that the sight is very feeble, but never quite absent, day and night being distinguishable. In certain cases there is only a central opacity, giving rise to nystagmus and strabismus, owing to what vision there is only taking place by the circumference. Infants with cataract and left to themselves see yet at the age of seven or eight years, but they reach this age without possessing any notion of objects. Frequently the eye has lost in size and visual power, and tends to atrophy; so that the question of operating at a later period should never be entertained, as the longer we delay the more reason we have to fear the diminution of the power of the retina, there being not only danger that the education of vision will take place slowly and imperfectly, but that also that the intellect, which owes in great part its development to the faculty of seeing and appreciating objects, may have this much retarded. All children very tardily operated upon not only take a long time in learning to see, but always see less completely than do those who have undergone the operation at an earlier period. M. Guersant is therefore an advocate for operating soon after birth. The prognosis is favourable when the eye exerts movements in search of the light; but, however this may be, there is no advantage gained by waiting, especially when the opacity persists during the first month; and from this time to two months forms a very good period for the operation to be performed.

The child is laid on a pillow, which is firmly fixed upon a plank of its own length. To this he is attached by means of two towels, the one passing over the arms and chest, and the other over the pelvis and thighs. He may be thus kept in the lying posture, or erect before the light. The head being held and the eyelid raised by an assistant, the operator, placed in front of the child or one side of him, accordingly as he is erect or recumbent, proceeds to perform extraction or depression—the latter, in the case of the cataracts of children, being the most eligible operation. If the child is a year or more old chloroform may be administered, but this should be abstained from when it is only some weeks of age. After the operation wet compresses are to be kept on the eye, and frequently renewed without opening it, the child lying in a darkened room. The cold water is to be continued for two or three days, and if there is pain or sleeplessness a spoonful of syrup of codein may be given. As applications, too, a strong infusion of lettuce leaves, or a collyrium composed of five centigrammes of sulphate of zinc and of sulphate of morphia to thirty grammes of water are to be applied. When there is inflammation or much pain a leech should be applied behind the corresponding ear, and an ointment of extract of belladonna with mercurial ointment smeared around the eye. Calomel is to be given as an aperient, and the legs are to be kept constantly wrapped in wadding covered over with oiled silk. When all is going on well the application of the wet compresses is gradually diminished, as is also the completeness of the darkness, full light of day not being allowed in the room until all pain and sensibility have disappeared. The eye, by means of shades or darkened glasses, must be protected from too vivid a light for some time.

Accidental cataract is usually developed in children without any known cause, although it has sometimes seemed to have arisen from children regarding the sun fixedly, or when they have been exposed to its rays, brilliantly reflected from a sandy soil. The same symptoms exist and the same treatment is required in them as in adults. When the affection supervenes in children debilitated by prolonged chronic affections, the operation usually fails.

Traumatic cataract is not unfrequently met with in children as the result of contusions or wounds of the eye. It only results from a more or less intense inflammation, which should be treated with perseverance; and we should wait a long time before deciding upon an operation. Mercurial ointment, belladonna, purgatives, flying blisters behind the ears, are means which M. Guersant has found of service in cases to which he was called for the purpose of operating; but still their employment must not be too much insisted on, and if in five or six months they have not produced good effects, the operation must be resorted to. It is not rare, however, to find these cases complicated with amaurosis, which contra-indicates the operation.

IV. *On the Operation for Empyema.* By Professor Roser.
(Archiv der Heilkunde, 1865, No. 1.)

Professor Roser observes that, although this is one of the most simple and satisfactory of operations, many practitioners entertain a most exaggerated dread of it, while manuals are filled with warnings and restrictions respecting it. The consequence is that many patients are allowed to sink without any attempts having been made to save them. Three prejudices seem especially to stand in the way of the more general adoption of the operation—viz., the danger of air penetrating into the cavity of the pleura, the incapability of the lung to re-expand, and the obstinate tendency to a reproduction of the exsudation. The author has already shown the groundlessness of these objections in a series of cases which he published in the last volume of the *Archiv*. These cases demonstrated that the free admission of air formed one of the best means of correcting the fœtidity of the pus, that the expansion of the lung takes place with remarkable rapidity after the operation, and that under the daily introduction of the catheter through the aperture the purulent secretion soon ceases. It is, in fact, an error to suppose that a tendency to the reproduction of the pus is an inherent character of the disease.

True purulent empyema does not resemble a dropsical effusion, as hydrocele or hydrovarium, in which the fluid is reproduced, but is analogous to an acute abscess, like which it should be treated. The fact of the aperture remaining fistulous instead of healing is not due to the reproduction of the pus, but is principally caused by the fistular track becoming valvular. This valvular condition, as the author has shown in prior communications, is a common cause of fistular apertures not healing, and it may readily be overcome by the daily introduction of a catheter which secures the complete discharge of the pus. Another impediment to the healing arises from the falling together of the ribs. This is not often met with when the discharge takes place spontaneously, as this takes place anteriorly. But the usual spot for operating between the fourth and sixth ribs, just under the axilla, however convenient it may seem for the discharge of a large empyema, has great disadvantages. So mobile are the ribs here, that even at an early stage of the treatment they approach each other so as to impede the discharge of pus, and rendering the introduction of a canula or catheter painful and difficult. In such a case the simplest remedy will be to abandon this spot and make an aperture at the anterior part of the intercostal space, where, the ribs being fixed by the sternum, cannot fall together. When, however, there is lateral encapsulation of the pus, this anterior spot must not be selected. In some cases, when the slowness of healing is due to the flow of pus being obstructed by the juxtaposition of the ribs, a small portion of one of these may be excised; and Dr. Roser gives a case in which he executed such an excision. When the pus is encapsulated at the posterior part of the thorax it may be discharged spontaneously, as it was in two of the author's cases, the matter issuing at the tenth intercostal space, where the ribs were not able to closely approach each other. If an operation had to be performed, in such a case the *latissimus dorsi* would have to be divided; and this procedure has been followed with some advantage in a case of suffocative emphysema, and in another in which an abscess of the liver burst into the pleura. This last case he gives at full length; and he anticipates that at some future time many cases of encapsulated empyema will be treated by making an aperture in the thorax sufficiently large to admit of effectual exploration with the finger.

V. *Observations on the Management of Amputations.* By M. Gosselin. (L'Union Médicale, 1865, No. 10.)

In a recent clinical lecture on the management of amputations, delivered by M. Gosselin at La Pitié, he observed that always, when possible, he preferred not operating until strongly urged by the patient himself. "Frequently, in white swelling and other affections which may be delayed for some time without inconvenience, you find me waiting until the patients have realized the grave consequences of their malady, and have become accustomed little by little through conversation with their neighbours to the idea of an amputation, until at last they themselves urgently request that an operation may be performed. I wish, above all things, to avoid by pressing and urging them, to demoralize and change their ideas. Such precautions, in my opinion, play an immense part in preserving these patients from diseases consequent on great operations, as purulent infection, erysipelas, &c. . . . . You have also been witnesses of the minute details I go into in the preparation of the patient for the operation. I inquire into his previous habits, and ask him whether he is accustomed to the open air and can bear the cold, or whether he will feel annoyed at remaining in the row of beds on the side of the windows, which are often opened even in this inclement season. This frequent renewal of the air by opening them, I cannot too much insist on as one of the conditions I attach most importance to, and that of the reasons to which I most attribute the frequent success of the great operations at La Pitié. If the patient desired it, I would have had him removed to the other side; and had I not found him so anxious that the operation should be performed, I would have delayed it until he had become prepared for it by his neighbours and the sister. I particularly recommend you to consult the tastes of your patients as to the place in the ward they would like to occupy after the operation. I endeavoured to ascertain whether any of this man's neighbours were displeasing to him, and whether any of them were suffering from wounds which might prove injurious to him. I had a man with phlegmonous erysipelas transported to several beds away from him, on the principle that diseases capable of transmission by the surrounding air should not be allowed to remain in the vicinity of large wounds."

With regard to the form of operation, M. Gosselin states that, as a general rule, he prefers the circular to the flap operation, as being much less likely to be followed by secondary hæmorrhage. The occurrence of this he fears greatly, not only for its enfeebling effect upon the patient, but principally for the great suffering endured by the patient during the employment of means for arresting it. This proves a cause of demoralization which predisposes to severe traumatic fever, and consequently afterwards to purulent infection; for it is a matter of observation that the more intense the fever the more probable is the occurrence of purulent infection. For these reasons, M. Gosselin is very careful to apply the ligature to every artery he can detect. As to the dressing of the stump, he has renounced all attempts at effecting union by the first intention. These induce pressure and traction of the edges of the wound, compress the stump, and impede the swelling of the parts which takes place during the inflammatory stage. Pain is induced, and the severer the pain the greater the chance of fever and purulent infection. This mode of dressing, too, retains on the surface of the wound putrescent matters, the absorption of which may lead to redoubtable accidents. Experience has shown that union by the first intention can rarely be attained in Paris in the adult, so that in attempting it the patient runs the risk of the dangers incidental to its employment, with very slight expectation of any attendant benefit.

"I again lay down the rule, which should never be neglected, of avoiding the infliction of pain in dressing after amputation, resorting only to means the application or renewal of which gives rise to no suffering. Here is the procedure which I have adopted for several years past:—The stump is laid upon a cushion covered with a piece of oiled silk, and a simple compress wetted with cold water is placed over it, only covering, however, its anterior and lateral part, in order that it may be changed without raising the limb. This is renewed three or four times a day, which can be done without causing any pain; while, if the patient is pusillanimous, I allow him to change the compress himself. When, too, at a later period, the occurrence of suppuration renders it necessary to change the cushion and oiled silk, I request him to raise his limb himself, in order to avoid all suffering or unpleasant feeling."

M. Gosselin is inclined to think that the success which attends the alcoholic dressing, now employed after amputation in several of the Paris hospitals, is in a great measure due to the absence of constriction and retention of purulent matters incident to former modes of dressing. When the inflammatory and painful stage has passed and healthy granulations begin to appear, and all mortified parts have been eliminated, he straps up the stump. In place of the starving regimen formerly in vogue at Paris, he now feeds his patient well after amputation, giving him roast meat and good wine, and, if accustomed to alcoholic drinks, a little rum or brandy. Efficient ventilation of the wards, without chilling the patient, is insisted upon, and he is encouraged to get up as soon as the sensibility of the stump will allow. Sisters, nurses, and neighbouring patients are charged to accommodate themselves to his wishes; those who are on the point of death are removed from his vicinity, and friends from out of doors are prohibited from communicating any bad news.

VI. *On Healing without Suppuration after the Removal of Tumours.* By M. Petrequin. (Gazette Hebdomadaire, 1865, No. 7.)

M. Petrequin gives in this paper the account of a case in which he has adopted a new mode of healing the wound left by the removal of a tumour from the side of the face and neck. He observes that cases come daily under the notice of the surgeon in which union by the first intention being impracticable, prolonged suppuration and disfiguring cicatrices are the consequences of the means adopted. It occurred to him to resort under these circumstances to the use of iodine, owing to its well-ascertained power of checking suppuration. Having, therefore, completed the ablation and left a large cavity in the neck which it would have been imprudent to attempt to close by first intention, the author thoroughly dabbed its entire interior two or three times with a pledget of linen, well soaked in iodine. Its size was then diminished as far as possible by means of sutures, and two small strips of linen well soaked in the iodine was left within its interior. The wound was then "hermetically" closed by strips of linen dipped in collodion, and a certain amount of compression employed by means of diachylon and a bandage. On the fourth and sixth days the dressing was partially renewed, no suppuration having appeared. By the ninth day, when the dressing was for the first time entirely renewed, the wound had much contracted in size, and injections of iodine were practised. Iodine compresses were also applied, and after a few days longer "the cure was completed, and that with all the advantages of union by the first intention —that is, without inflammation or suppuration, and without engorgement or a painful condition of the edges of the wound. There was a fine, narrow, colourless cicatrix, which two months later had become linear and almost imperceptible." The iodine mixture employed at the time of the operation consisted of one part of the iodide of potassium and ten of tincture of iodine, and for the subsequent dressings this was diluted with equal quantities of water.

VII. *On the Prevention of Ill Effects from dropping Atropin into the Eye.* By Dr. Liebreich. (Klinische Monatsblätter für Augenheilkunde, 1864, pp. 411.)

At the meeting of ophthalmologists at Heidelberg, Dr. Liebreich brought under their notice a small instrument which he has devised (made by Luer, of Paris), in order to prevent the poisonous effects of atropin exercising themselves when this substance is dropped into the eye. The fear of their occurrence not unfrequently prevents an energetic employment of this means. They do not result from the quantity of the atropin that may be absorbed by the eye, but from the portions which gain admission to the throat and stomach through the lachrymal passages. In fact, the remarkable difference observed in their sensibility to the influence of this means is exclusively dependent upon the greater or less permeability of these passages. Where these are completely obstructed, the strongest and long-continued applications do not give rise to any general symptoms whatever. The patient, therefore, should be recommended, while employing these drops, to bend the head much forwards, to frequently blow the nose and gargle, and to apply a finger to the inner angle of the eye, so as to keep the lower punctum downwards. As these directions cannot, however, always be observed, and under the very energetic use of atropin do not suffice, the author has contrived a small forceps, in the form of a *serre-fine*, by the aid of which fluid dropped into the conjunctiva may be prevented traversing the lachrymal passages. Raising a fold of the eyelid parallel with its edge, it is so held with the inferior punctum, by the *serre-fine*, as to produce an entropium. In very sensitive persons, or when very large doses are employed, a *serre-fine* may also be applied to the upper punctum, but in most cases this is not required.

During the discussion which followed the reading this paper, Dr. Jacobson observed that even after the long-continued use of moderate quantities of atropin he had met with no severe symptom of intoxication, although dryness in the throat, thirst, and sniffling often occur. In some individuals the susceptibility is so great, that from six to eight drops give rise to violent symptoms; but, as a general rule, the effects are so slight and transitory that the employment of an instrument seems scarcely called for. Professor Arlt having met with difficulties in treating cases in consequence of the effects produced by the atropin, although the lower lid has been held in order to prevent its entering the punctum, thought well of the instrument. He instanced cases of extraction after which atropin may have to be energetically employed, risking the production of restless dreams.—Professor Von Graefe stated that he had already published the recommendation to close the eye gently with the hand immediately after dropping in the atropin. If in about half a minute the eye be opened and washed out, the local object of the application will have been attained, while all general effects are prevented if all winking of the eye be avoided as long as the atropin remains in contact with the conjunctiva.—Dr. von Welz stated that the inconveniences may be avoided by employing the atropin in the form of ointment.—Professor Donders feared that the pinching of and speedy washing out the eye would impair the influence of the atropin on the pupil. A very dilute solution, kept in longer contact with the eye, produces an influence not to be obtained by short contact. A sufficiently long contact may be secured and ill effects prevented by drawing down the lower lid and compressing the punctum with the point of the finger. This renders an instrument unnecessary.

SUMMARY.

Amputation.—Feoktistow, Preservation of the Periosteum during Amputation. (Berlin. Med. Wochenschrift, Nos. 2 and 3.)

Ankylosis.—Philipeaux, Value and Indication of Rupture of Ankylosis. (Gazette Hebdom., No. 5.) In corroboration of the practice of Bonnet, of Lyon.

Bone.—Ricket, Vascular Tumours of Bone. (Archives Gén., Dec., Jan., Feb.) The detailed account of the anatomical examination of a case given which came under the author's notice, with a critical examination of six other recorded cases.—Jobert, Contusion of Bones. (L'Union Méd., Nos. 17 and 22.)—Kuhn, The Varieties of Osteomalacia. (Rev. Méd., Jan. and Feb.)—Allen, Osteomyelitis, with Cases. (American Journal of Med. Science, Jan.)

Cæsarean Section.—Zoja, Case of Gastro-hysterotomy. (Annali Universali, Jan.) With fatal issue for mother and child.

Cataract.—Jacobson on his Operation for Extraction. (Klinische Monatsb. d. Augenheilkunde, Dec. 1864.) Read at the meeting of ophthalmologists at Heidelberg, and followed by an interesting discussion.

Dislocation.—Scuh, Dislocation of Cervical Vertebræ. (Wien. Med. Wochenschrift, No. 1.) Relates two cases of partial dislocation produced by turning the head, without external violence.

Ear.—Roosa, Removal of Foreign Bodies from the Ear. (American Journ. of Med. Science, Jan.) Strongly condemns the means advocated by Gross and quoted in our last. He has always found tepid-water syringing sufficient.—Guersant, Removal of Foreign Bodies from the Ear in Children. (Bull. de Thérap., Dec. 30.)—Triquet, Perforations of the Membrana Tympani. (Gaz. des Hôp., No. 29.)—Auspitz, Eczema of the External Ear. (Archiv der Ohrenheilkunde, No. 2.)—Triquet, Chilblains of the Ear. (Gaz. des Hôp., No. 13.)

Elephantiasis.—De Cigella, Elephantiasis, or Lepra Græcorum. (Annali Universali di Med., Jan.) An elaborate dissertation translated from modern Greek into Italian.

Excision.—Barton, Excision of the Knee. (Dublin Journal, Feb.)—Langenbeck, Excision of the Ankle-joint in Gun-shot Wounds. (Berlin. Med. Wochenschrift, No. 4.)—Lyon, Excision of the Knee and Hip-joints. (American Journal of Med. Science, Jan.) No original cases, but tabulated reviews of those which have been published since Dr. Hodges' tables in 1861.)—Ried, Case of Excision of the Upper Jaw. (Jena Zeitschrift, No. 2.)

Eye.—Fonssagrives, Neuralgic Character of Photophobia. (Bull. de Thérap., Jan. 30.) Advocates the employment of quinine in considerable doses in the forms of ophthalmia in which photobia is present, especially phlyctenular ophthalmia and syphilitic iritis.—Borlee, Rheumatic Ophthalmia. (Bull. de l'Acad. de Méd. de Belgique, Nov. 1864.)—Guépin, Internal Ophthalmia. (Annales d'Oculistique, Jan.)—Loschner, Organic Diseases of the Cornea occurring during the Diseases of Childhood. (Jahrbuch der Kinderheilk., 1864, No. 7.) The diseases alluded to are divided into two groups, the convulsive and the hyperæmic, involving the brain or its membranes during eruptive fevers.—Gritti, Case of Staphyloma treated by the Ligature. (Gaz. Med. Ital. Lombard., No. 2.)

Fingers.—Delore, Treatment of Congenital Syndactylism. (Bull. de Thérap., Jan. 15.)

Fracture.—Tufnell, Immediate Treatment of Fracture by Fixed Apparatus. (Dublin Journal, Feb.) An interesting account of the practice in this respect at the various British hospitals, obtained by circulars.—Friedberg, Production and Diagnosis of Fractures of the Orbital Plate. (Virchow's Archiv, vol. xxxi. No. 3.)

Hip-joint Disease.—Guerin, General Observations on Coxalgia. (Gaz. Méd., 1864, No. 52.)—Guersant, Treatment of Coxalgia in Children. (Bull. de Thérapeutique, Dec. 15.)

Hospital Gangrene.—Packard on Hospital Gangrene. (American Journal of Med. Science, Jan.) Even the worst cases are successfully treated by covering the surface, after thorough cleansing, with powdered white sugar or other non-oxidizable substance.

Larynx.—Weiss, Extirpation of a Polypus of the Larynx. (Petersb. Med. Zeitschrift, 1864, p. 239, with woodcuts.)—Fournié, Extirpation of Tumours of the Larynx, especially by Cauterization. (Gaz. des. Hôp., No. 4.)

Ophthalmoscope. — Monoyer on a Portable Ophthalmoscope. (Annales d'Oculistique, Dec. 1864.)

Ovariotomy.—Peaslee, Statistics of Ovariotomy. (American Journal of Med. Science, Jan.) Relate to 150 cases which have been published in Europe and America during 1860–63.

Ovary.—Eichwald, Colloid Degeneration of the Ovary. (Wurzburg. Med. Zeitschrift, vol. v. No. 5.)

Palate.—Ried, Cases of Adhesion of the Soft Palate to the Pharynx. (Jena Zeitschrift, No. 4.)—Passavant, Prevention of Nasal Sound in Cleft Palate. (Archives Gén., Jan.)—Annandale, Cleft Palate. (Edinb. Med. Journal, Jan.)—Collis, Cleft Palate. (Dublin Journal, Feb.)—Preterre and Gron, New

Obturators in Cleft Palate. (Gazette des Hôp., Nos. 3 and 30, with woodcuts.)

Pericardium.—Mirel-Lavallée, Rupture of the Pericardium. (Gaz. Méd., Nos. 46-53.) Three cases are related of this undescribed lesion, the existence of which is said to be infallibly indicated by the *bruit de roue hydraulique* or *bruit de moulin.*

Plastic Surgery.—Ried, Plastic Operation for a Sub-hyoïd Fistula. (Jena Zeitschrift, No. 3.)

Spine.—Eulenberg, Distortion of the Spine. (L'Union Méd., 1864, Nos. 135-146.)

Strabismus.—Javal, Treatment of Certain Cases of Strabismus. (Monatsblatt. der Augenheilk., Dec. 1864.) Binocular vision is exercised by the agency of the stereoscope.

Stricture.—Demarquay, Case of Stricture in the Female. (Gaz. des Hôp., No. 16.)

Syphilis.—Soresina, Mucous Tubercles of the Pudenda in Prostitutes. (Gaz. Med. Ital. Lombard., 1864, No. 52.)—Roger, Clinical Observations on Infantile Syphilis. (L'Union Méd., Nos. 10-19.)—Libermann, Phagedænic Chancre in Mexico. (Rec. de Mem. de Méd. Mil., Nov. 1864.) Phagedænic chancre is of very frequent occurrence among the French troops in Mexico, and is best treated by fractional doses of mercury.

Trichiosis.—Wright on Trichiosis. (Dublin Journal, Feb.)

Varicose Veins.—Simpson, Rupture of Varicose Veins. (Ed. Med. Journ., Feb.)

Vesico-Vaginal Fistula.—Banon, Surgical Treatment of Vesico-Vaginal Fistula. (Dublin Journal, Feb.)

QUARTERLY REPORT ON MIDWIFERY.

By Robert Barnes, M.D. Lond.,

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I. The Non-Pregnant State.

1. *Vagina divisa cum utero duplici.* By Dr. Laaser. (Monatsschr. f. Geburtsk., Dec. 1864.)
2. *A Case of Fibroïds of the Uterus, and Cancerous Infiltration of the same with Primary Cancer of the Vagina.* By Drs. Benporath and Liebman. (Monatsschr. f. Geburtsk., January, 1865.)

1. Dr. Laaser describes the case of a lady who had been married several years without pregnancy. On examination it was found that the finger entered easily into a capacious vagina of normal length, which ended above in a nearly blind sac; there was only a rudiment of a vaginal portion without os uteri, but there was a longitudinal septum forming a smaller vagina, which latter was surmounted by a portio-vaginalis and os uteri. It was presumed that the uterus was also double. The sterility was accounted for by the blind vagina only being used, the vagina connected with the normal cervix being pushed aside. The septum was slit, so as to throw the two vaginæ into one.

2. The case of Drs. Benporath and Liebman bears upon the question whether uterine fibroïds are liable to cancerous invasion. A woman, aged forty-eight, had suffered from metrorrhagia, had had in early life several abortions, and in the latter years had never conceived. A tumour became manifest in the abdomen. After death a careful examination was made. There was a fibroïd near

the right Fallopian tube, another almost encircling the uterine cavity lower down; carcinoma of the upper part of the vagina. It resulted that the lower segment of the uterus was invaded by the progress of the vaginal cancer, and with it the fibroïd tumours contained in its walls. The lower parts of the tumour were most affected; the upper parts, those most remote from the original seat of the cancer, were free.

II. PREGNANCY.

1. *On the Carunculæ of the Human Amnion.* By Dr. KEHRER. (Monatsschr. f. Geburtsk., Dec. 1864.)
2. *Observations on the Position of the Fœtus during Pregnancy.* By Dr. CREDÉ. (Leipzig, 1862-1864.)
3. *On a Method for Observing the Position of the Fœtus in Utero by the Eye.* By Dr. AUBINAIS. (L'Union Méd., Dec. 1864.)
4. *The Form of the Basis of the Thorax in Pregnant and Lying-in Women.* By Prof. DOHRN. (Monatsschr. f. Geburtsk., Dec. 1864.)

1. Dr. Kehrer cites Claude Bernard and Brown-Séquard as describing the cotyledons of the amnion of ruminants as consisting of several layers of epithelial cells, which assume on the surface the characters of pavement epithelium. He says he himself has found analogous formations in the amnion of mares. He cites Birnbaum ('Researches on the Structure of the Membranes of the Ovum in Mammalia,' Giessen, 1863) as having found similar epithelial growths in the amnion of the sow. Kehrer now says he has discovered carunculæ in the amnion of a primiparous woman. A number of small, white insulæ were found on the fœtal surface near the insertion of the cord. The borders were mostly round or elliptic. Most of the carunculæ were raised as thick as ordinary paper on the free amnion-surface; they resembled the papillæ of the tongue. These bodies consisted of cells distinct from the surrounding amnion by their lighter edges and considerably greater size.

2. Dr. Credé has made minute observations on 240 cases, from which he concludes that the fœtus changes its position more frequently than is generally supposed. In one Table (A) are 72 cases, in which repeated examinations always gave the same position—viz., 45 times the first cranial, 25 times the second cranial, and twice the second breech. The shortest interval of observation was four days, the longest seventy-six days before delivery.

Table B, contains 24 cases. In every case a longer period of observation was practised, and exhibited in the beginning a different fœtal position from the one signalized later.

Table C, includes 82 cases. In these the head or breech always presented, and at from three to ninety-four days before delivery the presentation was changed, sometimes even shortly before delivery. It was observed that the greater number of cases—viz., 55, ended in the first cranial position, 24 in the second, 1 in the first breech, and 1 in the first foot-presentation.

Table D, contains 50 cases, in which transverse and breech presentations finally changed into cranial (with one exception).

Table E, contains 12 cases, marked by the most remarkable and abnormal changes of position; 7 ended in cranial presentations, 1 in face, 3 in breech, 2 in transverse.

3. Dr. Aubinais, of Nantes, has attempted the task of applying transmitted light to the investigation of the position of the fœtus in utero. He starts from this: Put a fœtus into a bladder filled with water, it is easy to observe

all the positions imparted to the fœtus by movements of the bladder. These are seen still more clearly if the bladder is covered with black paper, and two small windows are made in it opposite to each other, so that a candle can be applied to one, whilst the eye of the observer is applied to the other. In this manner he was enabled to observe a loop of intestine in a marked case of ascites. He also says, in a case of labour with excessive amniotic distension, he felt a loop of umbilical cord in the os uteri through the membranes. He covered the abdomen with black paper, making a small window on the side, and whilst a candle was held to this, he examined the os by aid of a speculum and another candle. *He thus saw floating in the liquor amnii the loop of cord.* He recites other observations.

4. Professor Dohrn has made measurements of the thorax during pregnancy and the puerperal state. He says, the idea prevailed that, during gestation, the abdominal cavity was enlarged at the expense of the thorax. Kuchenmeister first doubted this (1849). He determined the capacity of the lungs by the spirometer in several persons during gestation, and at distant periods afterwards, and found only a slight difference. Wintrich also, in 52 pregnant women, found the same proportion between the stature and the lung capacity as in non-pregnant women; and in 12 cases in which he examined the same persons after labour observed nearly the same height as before labour.

Gerhardt has made observations upon the condition of the diaphragm in pregnant women. Of 42 cases, he found in 36 a normal condition, five times a lower position, once a higher, and this in persons in the last period of gestation. It was found from 8 observations of Schultze, that the basis of the thorax was expanded during gestation, and contracted after labour. Lastly, he comes to the conclusion, from the region of heart-dulness, that in pregnancy the sterno-costal part of the diaphragm is not displaced, but that the vault of the diaphragm is more arched, so that the heart is pressed forward against the wall of the chest.

Dohrn measured the chests of fifty persons, first, in the last week of pregnancy; and secondly, within the first eight days after labour. He selected two points for measurement: first, around the thorax, under the axillæ; second, round a line on a level with the root of the ensiform cartilage. The person was in the upright position, arms hanging down. Result:—In most cases the base of the thorax shows a greater width during pregnancy than in childbed; and on the other hand, a lesser depth from before backwards. With the emptying of the uterus, this relation changes. The thorax falls from the sides together; its transverse diameter diminishes; its antero-posterior diameter increases. These changes of form are less frequent and less marked at the level of the axillæ than in the basis. The cause of this change lies in the yielding of the thoracic walls at the front, the sternum and costal cartilages being the least fixed parts. Dohrn admits that his observations are too few for the determination of the question.

III. LABOUR.

1. *Separation of a Fibrous Uterine Polypus in a Forceps Labour.* By Dr. ROBERT POHL. (Monatsschr. f. Geburtsk., January, 1865.)
2. *On Entrance of Air into the Uterine Veins, with a Fatal Case following the Uterine Douche.* By Dr. R. OLSHAUSEN. (Ibid., Nov., 1864.)
3. *Accouchement forcé through the Urethra.* Communicated by Professor SPIEGELBERG. (Ibid.)
4. *Laceration of the Uterus: Investigation as to Homicide from Malapraxis.* By Professor HOFFMANN. (Ibid.)

5. *Two Cases of Laceration of the Uterus* (Obstetric Contributions.) By Dr. ABEGG. (Monatsschr. f. Geburtsk., January, 1865.)
6. *On a Method of Decapitation without Instrumental Aid.* By Dr. REY. (L'Union Méd., Dec., 1864.)
7. *Cæsarean Section, with Successful Result to Mother and Child.* By Dr. ENDER. (Monatsschr. f. Geburtsk., January, 1865.)
8. *Description of the Uterus and Abdominal Walls of a Woman who Died Twenty-four Years after Cæsarean Section.* By Dr. FULDA. (Ibid., Dec., 1864.)
9. *Report of the Lying-in Institution of Dantzig from* 1840 *to* 1863 (*inclusive.*) By Dr. ABEGG. (Ibid., Dec., 1864.)
10. *Oleum Origeroni in Uterine Hæmorrhage.* By J. G. RICH. (Canada Lancet, Sept., 1864.)
11. *On Obstetric Statistics.* By Professor HECKER. (Monatsschr. f. Geb., Dec., 1864.)

1. Dr. Pohl attended a primipara whose labour was tedious and complicated with bleeding, and the descent of a tumour into the vagina. The stalk of the tumour was traced to the cervix uteri, which was quite open. The forceps was applied to the head, whilst the tumour was held up by the midwife. As the shoulders were extracted the polypus fell out. The patient did well; there was no more bleeding.

2. Dr. Olshausen relates a fatal case of entry of air into the uterine veins. A secundipara of robust frame, aged twenty-nine, was at term. The uterus was unusually distended; no albumen in urine. Labour lingering; uterine douche used. The water was of 30° Réaumur; it was forced into the vagina by a pump, gently. A third injection was made by a midwife. After eight minutes' use the patient began to complain of oppression. The tube was withdrawn. The patient rose in bed, immediately fell back senseless, and died in a minute at most, under convulsive respiratory movements and distortions of the face. Eight minutes later bleeding by the median vein was tried, but only a few drops flowed. On touching the body, distinct and widely-spread crepitation was felt.

Autopsy, eight hours after death.—A large quantity of dark fluid blood escaped from the sinuses of the dura mater. The cerebral membranes very hyperæmic; brain normal; lungs somewhat congested; heart lying transversely, apex in fourth intercostal space. Left ventricle in firm contraction; right quite soft, something like an intestine with thick walls; the coronary vessels contained a quantity of air-bubbles. Left heart had scarcely any blood; the right held little, but it was frothy. *Abdomen:* The distended uterus crepitated everywhere on pressure under the hand. A number of vessels of medium calibre immediately under the peritoneum were plainly filled with air. The right broad ligament was strongly distended with air-bubbles; and this emphysema of cellular tissue extended from the broad ligament through the retro-peritoneal space to the inner side of the right kidney, and even below the liver to the vena cava ascendens. *The vena cava ascendens was enormously distended*—it was at least an inch in diameter. The distension was mainly owing to air. The uterus was divided in the median line. A placenta was attached to the anterior wall; a small flap to the right was detached from the uterus. Another placenta was attached behind and to the right. A larger portion of this had been separated, so that there was a sort of pouch between it and the uterine wall. The two ova were uninjured. Death was caused by forcing air into the vessels of the placental-site. It was concluded that the tube had been passed into the uterine cavity, and that air had been sucked up with the water by the pump.

[This case presents another example of the danger of resorting to the vaginal douche for the purpose of inducing labour, a danger from which the more certain and expeditious method of hydrostatic dilatation of the cervix uteri, recommended by the Reporter, is free.]

3. Professor Spiegelberg relates an extraordinary case in which a practitioner, endeavouring to bring on labour on account of convulsions, mistook the urethra for the vagina. He passed his finger up the urethra, and appears to have lacerated the base of the bladder. Copious hæmorrhage followed. The woman died undelivered. On dissection, it was found that the cervix uteri was intact; the vagina was torn at the lower part in front; the bladder contained clots of blood; the neck of the bladder and the urethra were actually torn up, there remaining no trace of vestibulum.

4. A midwife was presumed to be in presence of a transverse presentation and made fruitless attempts to turn. A cupper, after long exertion, delivered the child. According to eye-witnesses, the midwife immediately introduced her hand, and with great roughness dragged away the placenta; intestines followed. A medico-legal investigation was instituted. The dissection revealed: coagulated blood in the pelvic cavity; a third of the small intestines projecting through a rent into the vagina. There was a rent ten inches long, beginning on the right side of the body of the uterus, continued through the lower segment and into the vagina. The walls of the uterus and the decidua were obviously injured, showing sugillations; pelvis normal. When was the rupture effected? What was the agent? The decision was, that the midwife did it in extracting the placenta, as the marks of violence began in the inner wall of the uterus, near the insertion of the placenta.

5. In a report of his practice (presumed to be private) Dr. Abegg relates two cases of rupture of the uterus:

Case I. A woman, aged forty-one, was in her tenth pregnancy, suffering from carcinoma of the portio-vaginalis uteri, and extensive cancerous infiltration of the uterus proper. In her eighth month it became necessary to extract the child—footling presentation—on account of severe hæmorrhage, the result of the rupture. The mother died of peritonitis. In the posterior wall of the uterus was a large fibroïd.

Case II. A woman, aged thirty-five, when about three months pregnant for the third time, was seized with peritonitis. At term, after twelve hours' labour, the pains became enfeebled, the signs of the child's life disappeared. Four hours later, a strong shivering fit occurred, attended by a loud cry of the woman; the child was expelled dead, head presenting. Copious bleeding took place into the abdominal cavity. The mother quickly died.

6. Dr. Pajot having shown how the head of a fœtus in utero might be separated by aid of a cord, Dr. Rey was led, in a case where he had no instruments at hand wherewith to apply a cord, to effect his purpose without. He carried a loop over the neck by means of the index of one hand, and seized it with the other hand, and by a saw-movement decapitated. The mother did well.

7. Dr. Ender relates a successful case of Cæsarean section. A woman, aged twenty-seven, a sempstress in wretched poverty, very rhachitic, three feet three inches high, was admitted into the Lying-in Hospital at Trier. Measure-

ments: External conjugata, 6″; distance of the anterior spinous processes, 8½″; distance of the trochanters, 10″; circumference of the pelvis, 30″; distance of the tubera ischiorum, 2″ 9‴; from the point of the sacrum to the lower edge of the symphysis, 3″ 3‴. The entire sacral cavity was very small, easily compassed by one finger. The conjugata vera was estimated at 2″ 8‴.

Labour having set in, the operation was performed under chloroform. Profuse hæmorrhage followed the incision in the uterus; the patient seemed for a time moribund, but as soon as the child was removed the bleeding stopped. The convalescence was tedious, but ultimately mother and child did well.

8. A rhachitic woman underwent Cæsarean section at the age of twenty-nine; recovered, and died after twenty-four years, of pneumonia. The parts on dissection showed: the scar presenting a distended, saccular prominence the size of a goose's egg; on the inside of the scar, a loop of small intestine three inches and a half long adhering; the anterior upper surface of the uterus adhering by a strong, thick, cellular membrane to the abdominal wall, whilst the uterus, tubes, and ovaries were free. The body of the uterus was four inches long; the mucous membrane smooth, nowhere showing a trace of incision. The uterine scar, however, was plainly seen in the wall on a transverse section.

9. Dr. Abegg gives an account of the practice of the Lying-in Institution of Dantzic, from 1840 to 1863 inclusive: 5190 deliveries took place; of these, 2441 were in primiparæ, 2749 multiparæ. There were 5011 head presentations, 109 breech, 94 footling, 56 transverse, 28 face, and 5 knee presentations.

The forceps was applied 275 times to presenting head, 31 times to the following head—i.e., in all, once in every 17 labours. The chief indication was uterine inertia when the head was in the pelvis.

Turning was performed 108 times—i.e., once in 49. The frequency of prolapsus of the cord, placenta prævia, and of twins and premature labours explains the relative frequency of this operation.

Eclampsia occurred in 35 cases.

The mortality is not given.

10. Dr. Rich calls attention to the use of the essential oil of the Canada flea-bane (Origeron Canadense) in uterine hæmorrhage. He says it was first introduced by Dr. Bournonville, of Philadelphia, in 1854, who gives it in doses of five to ten minims every two hours. Dr. Rich says, after years of frequent experience, "it is one of our most certain remedies in cases of flooding." It causes uterine contraction.

11. Professor Hecker has made a series of observations upon the duration of the several stages of labour; on the form of presentation observed in successive labours; the weight of the child; and the length of the umbilical cord. In 316 cases of women having had *two* labours the same presentation occurred in 192—i.e., the first cranial in 166 cases, and the second in 26 cases. The number of observations in women having had three or more labours was too limited to be of much value, but they justify the general conclusion that changes of presentation are more common than is generally admitted.

The Duration of Labour.—The mean duration of the first stage in 275 primiparæ was sixteen hours. The mean duration of the first stage in the same 275 persons in their second labour was ten hours.

In 277 primiparæ, the second stage lasted two hours. In 277 cases of the same persons, the second stage in the second labour lasted nine hours.

The Weight of the Child in relation to the Number of the Labour.

		Grammes.
The first child weighed on an average of	528 . . .	3201
„ second „ „	686 . . .	3330
„ third „ „	554 . . .	3353
„ fourth „ „	416 . . .	3360
„ fifth „ „	177 . . .	3412
„ sixth „ „	74 . . .	3353

Thus the regular increase of weight is first broken at the sixth child.

[In relation to this investigation of Dr. Hecker it deserves to be stated that Dr. Matthews Duncan having made observations in the same direction, contends that the weight of the child is not dependent upon the number of the labour, but upon the mother's age—that is, that a woman of thirty, who has borne several children, will have a child of corresponding weight with that of a woman of thirty, delivered for the first time. The weight, he says, increases up to thirty, and then tends to decline.—REPORTER.]

The Length of the Cord.—Hecker says it is worthy of remark that the cord was usually of the same length in the same individual.

IV. SUMMARY.

The following Memoirs are referred to by title only, either for want of space or because they are contained in easily accessible books :—

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A Critical Inquiry regarding Superfœtation. By Dr. G. L. Bonnar. (Edin. Med. Journ., Jan. 1865.)

A Case of Puerperal Peritonitis, successfully treated by Large Doses of Opium after Mercury had failed. By K. N. Macdonald. (Med. Times and Gaz., Feb. 1865.)

Case of Complete Absence of Vagina and Uterus. By Dr. Ripps. (Monatssch. f. Geburtsk., Dec. 1864.)

Case of Encysted Peritoneal Exudation, with Bursting into the Vagina, in a Child of Eleven Years. By Dr. Ripps. (Ibid.)

On a New Kephalotryptor. By Professor Hennig. (Ibid.)

A Case of Multilocular Echinococcus Tumour Obstructing Delivery. By Dr. Birnbaum. (Ibid.)

On the Condition of the Cervix Uteri during Gestation. By Professor Spiegelberg. (The professor confirms the observations of those who say the cervical canal retains its integrity.)

Retention of Urine Mistaken for Labour. By R. L. Johnson. (Dublin Med. Press, March, 1865.)

Pelvis with Multiple Exostoses. By Dr. Birnbaum. (Monatssch. f. Geb., Dec. 1864.)

On some Malformations of the Organs of Generation (*Uterus Unicornis: Uterus bicornis unicollis.*) By Wm. Turner, M.B. (Edinburgh Med. Journal, Feb. 1865.)

On the Surgical Treatment of Vesico-Vaginal Fistula. By A. P. Banon. (Dublin Quar. Journal of Med. Science, Feb. 1865.)

A Case in which Premature Labour was induced by the use of Dr. Barnes's Fluid Dilators. By G. H. Kidd, M.D. (Dublin Quarterly Journal, Feb. 1865.)

On the Etiology of Placenta Prævia. By J. L. Martin, M.D. (Australian Med. Journal, October, 1864.)

On the Use of Dr. Barnes's Dilators in Placenta Prævia, &c. By R. T. Tracy, M.D. (Ibid.)

Case of Compound Dislocation of the Ankle in a Pregnant Female (eighth month); Erysipelas; Sloughing; Delivery at term seven weeks after accident of a Live Child; Amputation four weeks afterwards. By P. H. McGillivray. (Australian Medical Journal, Dec. 1864.)

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On Cæsarean Section, and on other Obstetric Operations. By T. Radford, M.D. (British Med. Journal, March, 1865.)

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A Manual of the Practice of Surgery. By W. F. Clarke, F.R.S., Surgeon to the St. George's and St. James's Dispensary, and Assistant-surgeon to the West London Hospital. London: Renshaw. 1865. pp. 352.

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A Letter from John Davy, M.D., F.R.S., addressed to the Editors of the 'Philosophical Magazine,' in continuation of a former one, and accompanied by Documentary Evidence contributed by Sir J. South, F.R.S., and B. Gompertz, F.R.S., in Reply to a certain Charge made by C. Babbage, Esq., F.R.S., against the late Sir Humphry Davy when President of the Royal Society.

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Suggestions for Improvements in the Sewerage of Cities and Towns. By C. F. Moore, M.D., Senior Surgeon Peninsular and Oriental Steam Navigation Company. Dublin: Hodges and Smith. (Pamphlet.)

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Observations on the Functions of the Liver, more especially with reference to the Formation of the Material known as Amyloïd Substance, &c. &c. By R. M'Donnell, M.D., Lecturer on Surgery in the Carmichael School of Medicine. Dublin: Fannin and Co. (Pamphlet.)

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NOTICE TO READERS.

The Editor is particularly desirous of having all Reports of Hospitals, Asylums, Sanitary Boards, Scientific Societies, &c., forwarded to him; as also Inaugural Lectures, Dissertations for Theses, Medical and Scientific Addresses, &c.

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